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INCORPORATING

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ELECTRIC RAILWAY TRACTION

A Supplement illustrating and describing developments in Electric Railway Traction is presented with every copy of this week's issue

Government Contempt for Transport

JOSEPH ADDISON (1672-1719) wrote in No. 69 of *The Spectator* that "nature seems to have taken a particular care to disseminate her blessings among the different regions of the world with a view to mutual intercourse and traffic amongst mankind." Since then more than two centuries have passed, and that widespread distribution of natural wealth which impressed Addison has resulted in the development of extensive and complex systems of transport to facilitate "traffic amongst mankind" that have been described aptly as the arteries of civilisation. Leaders in all walks of life—Government, commerce, engineering, labour, to quote but a few—acknowledge that transport is a vital factor of the national existence, but, so far as Government circles are concerned, events show that this is all too often lip-service only. These thoughts are brought forcibly to our mind by a further change in the Ministry of Transport. The new Minister is the fifth occupant of the post in just over six years, and thus it is painfully obvious that Transport is regarded as a ministerial stepping stone. Of course we have not the slightest intention of casting any reflections on the personal fitness for the task of the distinguished occupants of the office; but even ministers with extensive specialised knowledge and the best will in the world would surely find it almost impossible to direct a consistent transport policy when they succeeded one another with such frequency. In all we have had twelve Ministers of Trans-

port in the twenty years that the office has existed, which gives an unduly short average term of service, even allowing for political changes. Dr. Burgin leaves his successor to pilot through Parliament whatever "square deal" legislation may be contemplated, an unenviable task for anyone who has not conducted the preliminary negotiations. The permanence of the permanent official provides no explanation, unless one accepts the implication that Government ministers are but figureheads.

* * *

A Station Survey

Judging by the attention given in the press to a paper read before the Royal Institute of British Architects on April 24, the railway station is a building in which the public takes a patronising interest. The author, Professor A. E. Richardson, surveyed the London terminals not altogether unkindly, showing that whatever opinion may be held of their relation to modern taste, they were not in their time designed simply to annoy the architectural dilettante. We quote a number of his observations in our Scrap Heap columns this week, and it will be seen that he is not only extremely kind to the proportions of King's Cross, but justifies the inspiration that made of Euston what today strikes many as a nondescript station behind a monumental façade. Growth of traffic forced inconveniences upon Euston that have blinded later generations of travellers to the inspiring quality of its approach. In Mr. Richardson's view the London terminal station as a class is obsolescent today, and he proposes that terminals in future might be ten miles out, and linked with the metropolis by a girdle line. We are grateful to him for not allowing progressive ideas to obscure a just appreciation of past achievements.

* * *

The Week's Traffics

Latest returns of the four main-line companies are for an ordinary week in 1939 which compares with the week including Easter Monday, 1938, so that passenger train traffics are down to the extent of £152,000. Merchandise and coal receipts would be expected to show increases in these circumstances, but it is satisfactory to note that the gains in merchandise and coal severally exceed the fall in passenger takings. Merchandise receipts are up £220,500 and coal earnings are up £214,500.

	16th Week				Year to date	
	Pass., &c.	Goods, &c.	Coal, &c.	Total	Inc. or Dec.	%
L.M.S.R. ..	53,000	+101,000	+87,000	+135,000	-578,000	-3.04
L.N.E.R. ..	41,000	+39,000	+68,000	+66,000	-622,000	-4.41
G.W.R. ..	30,000	+74,000	+49,000	+93,000	-181,000	-2.31
S.R.	28,000	+6,500	+10,500	-11,000	-74,000	-1.24

Among Irish railways the Belfast & County Down shows a decrease of £1,777 for the past week, but an increase of £77 for the 16 weeks. The Great Northern is down £1,400 for the week, but is up £21,350 on the year to date. With a decrease of £3,846 for the week, the Great Southern is now only £1,128 to the bad for the 16 weeks.

* * *

Budget Possibilities

Not very long ago a certain well-known economist wrote a letter to *The Times* suggesting that an increase in the National Debt might be a good thing for trade. Sir John Simon in his Budget speech on Tuesday announced that the total of the National Debt had risen in the past financial year by £137,000,000, due to heavy borrowing for defence measures. Taxpayers would like to see it rise much more if that would enable the Chancellor to reduce their current burdens without causing any restriction of expenditure for necessary national services. Indeed, the

Chancellor, by borrowing large sums for defence purposes, and not attempting to recover the money at once through taxation, has stimulated industry; we are producing more guns, and it has not been found necessary to consume less butter. The process seems capable of expansion; the borrowed money is paid out in wages which are at once spent, thus creating a demand on what may be called the bread and butter industries of the country. Could not this expansion of the National Debt go on at a greater rate than hitherto? The total never gets less anyway. The whole subject of national finance bristles with possibilities but is so enshrouded in mystery that it is doubtful whether the public is getting its full advantage.

* * * *

British Enterprise in Argentina

British enterprise in Argentina is the subject of a complimentary article published in the April issue of *The P.D. Review*, the organ of Powell Duffryn Associated Collieries Limited. The article describes Argentina a century ago as a country rich in possibilities open for development by all comers. Some who came, while admiring her potential wealth, lamented her poor communications, but others—the British—tackled that problem first and laid the foundations for the present British-owned railway system in Argentina of over 15,000 miles, or roughly two-thirds of all the railways in the country. In 1874 there were only 150 miles of railway in Argentina, but by 1899 that total had increased to 10,285 miles. Population figures for a roughly corresponding period show an increase from 1,830,000 in 1869 to 3,954,000 in 1895. Argentine development is a matter of interest to readers of *The P.D. Review* on account of the large annual purchases of British coal by that country, and particularly the proportion in which South Wales coal is favoured. Last year coal from South Wales accounted for 1,863,926 tons out of the total Argentine imports from Great Britain of 2,030,407 tons.

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The First Railway in West Scotland

As it was in April, 1839, that William Dixon, the Glasgow ironmaster, blew in the first blast furnace at his Govan Iron Works, the firm of William Dixon Limited, the present proprietor of the Calder and Govan Iron Works, has just celebrated the centenary of the event. Actually, the business is considerably older than 100 years, for the first William Dixon opened the Govan coal works in 1766, and about 1780 laid the first railway in the West of Scotland—a wooden wagon-way for the conveyance of his coals from the Govan coalfield to the Wherry Wharf on the Clyde at Windmillcroft, at the foot of West Street. The second William Dixon promoted the Polloc & Govan Railway, which was incorporated by Act of May 29, 1830. Its line ran from Rutherglen through his lands at Govanhill to the coal quay at Springfield, for the conveyance of his minerals, and used part of the old wagon-way. This railway was opened with horse traction on August 22, 1840, and became part of the Caledonian Railway in 1846. The Dixons, father and son, would seem to have had a penchant for making railways, and we find that the younger Mr. Dixon was also one of the promoters of the Monkland & Kirkintilloch Railway, which was formed in 1824 and opened in October, 1826.

* * * *

Light-Conditioned Trains

It is possible that a new advance in train travel through tropical, desert, and snow-covered countries has been inaugurated with the introduction of Polaroid windows on

one of the cars of the Union Pacific Railroad's diesel Pullman trains running between Chicago and California. Polaroid, an invention of Edwin H. Land, is a thin transparent film which, as it were, combs out and rearranges any light vibrations which pass through it, so that they vibrate in parallel planes, or are "polarised"; hence the name. Laboratory tests have indicated that at the middle of the spectrum, where the eye is most sensitive, light transmitted is 99.8 per cent. polarised. Polaroid windows make unnecessary any drawing of curtains to ensure privacy by night. By turning the disc to give the darkest position, the windows appear black to passengers inside the coach, and to anyone outside they are purple discs. During the day the same position would prevent the sun streaming in at one side of the car, or would nullify the glare from snow fields adjacent to the line. In the Union Pacific train the outside windows of the car are of non-sweat safety glass, and the two Polaroid discs are built into the car frame structure immediately inside the safety glass. The properties of Polaroid make it a suitable material for such things as photographic filters, glareless desk lamps, and the like, and it is also being used experimentally for the detection of internal stresses in metals and glass.

* * * *

Italy's Speed Awakening

During recent years Italy has proclaimed more than once her intention of being "first on land, on sea, and in the air." If her railways continue to progress in train acceleration with the speed at which recent developments have taken place, it may not be many years before this aim, so far as the railways are concerned, comes to realisation. To those who remember the sluggish and unpunctual trains of Italy 25 years ago, or even in the first years after the great war, the changes have been revolutionary. From Naples to Milan, a journey which occupied, at the minimum, 17 hr. in 1914, it is now possible to travel in 8 hr., the average speed for the 521½ miles being 65.2 m.p.h. including stops, or 67.4 m.p.h. excluding stops; the electric *rapido* concerned is now the fastest train in Europe over so great a distance. An article on page 707 of this issue reveals that five runs are now booked daily on Italian metals at speeds of over 70 m.p.h., and over 3,000 miles daily are scheduled to be covered at over 60 m.p.h. In the frequency and average speed of services even more thoroughgoing advances have been made. Between Rome and Milan the service has increased by 80 per cent. in 25 years and has been accelerated 35 per cent.; the present ten best trains on the service average 49.4 m.p.h. including stops, whereas the entire service of ten trains in 1914 averaged 31.0 m.p.h. The Rome-Naples service has expanded by 114 per cent., and its average journey time, over the new short route, has come down by 43 per cent.

* * * *

Electric Signal Lights in France

During the alterations made to signalling in conformity with the 1930 *Code des Signaux*, the opportunity has been taken to apply electric lighting to mechanical signals on the former P.L.M. and certain other French lines. With the grouped signals, so often met with in busy areas and not slotted mechanically with each other, contradictory night aspects used to appear. Coloured lights, however, over-ruled white ones in the same group, an arrangement never really satisfactory. It was desired to eliminate all contradiction in the new night aspects, but as some indications had two and others only one light, complicated spectacle and blinder mechanisms would have been needed. It was therefore decided to have electric lights in all such

cases and for all other signals on main routes, leaving long-burning oil lighting on secondary routes at stations without electric supply, and for outer signals. On the main routes primary cells are used where no supply is near at hand. Over 10,000 signals now have electric lights in the South Eastern Region of the S.N.C.F.

* * * *

Advantages of Chromador Steel

When it became necessary to lengthen a bridge at Buenos Aires on the Central Argentine Railway to accommodate a widened public roadway beneath, it was decided to use Chromador steel for the extra span for reasons other than strength. As the article on page 700 of this issue shows, the additional span of the bridge was identical in dimensions with that of the original span, and use of the high-tensile rust-resisting steel was dictated not because the new span was required to be stronger but because of its lighter weight for the same strength, thus facilitating carriage and reducing freight from England, where the structure was fabricated. In addition, economy in maintenance is of course a valuable asset of Chromador steel, for in such a situation as this bridge occupies, on a line carrying a very heavy traffic, painting is both difficult and expensive. The estimated saving in this respect, coupled with the reduced weight of the steelwork, is calculated more than to offset the greater initial cost involved in the use of the more expensive special steel. It may be recalled that Chromador steel was used for the two-mile long Storstrom bridge opened in Denmark on September 26, 1937, and described in our issue of October 22 of that year (page 691).

* * * *

Unintentional Track Spirals

Readers of the Australian paragraph in our Overseas columns this week can hardly be blamed for incredulity as to the effect of a flood therein described, before they have seen the illustration (on page 702) proving that description to be correct. This is reproduced from what is, surely, one of the most remarkable photographs of a railway ever taken. Railwaymen in the tropics are only too familiar with the track hanging in festoons across breaches in the formation, but for the complete track to be rolled over and over in the form of a great corkscrew with at least four complete spirals has to be seen—on the ground or in a photograph—to be believed. Presumably the flood water, after topping the very low bank, spilt over the track and in doing so formed a scour under the downstream ends of the sleepers. As the scour increased, the downstream halves of the sleepers tilted downwards, the upstream halves rearing up and forming a direct obstruction to the flood, which must have had great velocity. This would tend to throw over the upturned ends of the sleepers and so the rolling-over action would be carried on. One of the most remarkable features of the illustration is that no single sleeper appears to have come adrift from either rail, though apparently secured only by dog spikes to the flat rail foot. The above explanation is pure supposition and is open to criticism and counter explanation, which we invite.

* * * *

The Problem of Wood Preservation in China

In a treatise on wood treatment in Germany and the U.S.A. and its importance for Chinese railways, by Ching-yuan Wu, B.Sc., A.M.I.Loco.E., it is stated that in China the life of a sleeper is only from 8 years in the north to as little as from 3 months to 2 years in the south, and that therefore the cost of renewals is very high in

that country. In Germany, Mr. Wu points out, a large percentage of steel sleepers is used—which are too costly for China—but wooden sleepers are very satisfactorily treated with tar creosote or a solution of Wolman salts, and their life varies from 25 to 30 years. In the U.S.A., treatment is usually with creosote, a mixture of creosote and petroleum, or a solution of such salts as copper sulphate or zinc chloride. Wolman salts have also been successfully used there. The average life is from 22 to 30 years. After reviewing the properties necessary for the treating agency, the author concludes that Wolman salts are the most suitable general preservative for China, where there is at present no tar or creosote, as they are cheaper than imported creosote, more easily transported, and timber treated with them can be painted and is odourless.

* * * *

Methods of Timber Treatment

Methods of timber treatment are discussed by Mr. Wu in the treatise referred to above. The author assumes, correctly, that sleeper treatment must be by the pressure method, and he discusses the relative merits of the full-cell (Bethell) and the empty-cell processes of injecting creosote. In the former, the timber is first submitted to a vacuum to remove as much air from its cells as possible, and the preservative is then admitted without the readmission of air, and finally it is forced into the cells; a second vacuum application removes excessive preservative and prevents dripping and waste. In the empty-cell process the preservative is injected into the cells, which are filled with air, and when the pressure is released the air drives out excessive preservative; net absorption is less than in the full-cell process. The empty-cell treatment is, Mr. Wu says, generally used for sleepers, whereas the full-cell process is adopted for piles, bridge timbers, and telegraph poles. For treatment with a solution of chemical salts the full-cell process only is used. The treatise concludes with notes on the cutting up of logs, the enemies of timber—fungus and insect, a creosote specification, and a bibliography on the subject generally. The subject of timbers and relative merits of hardwoods and treated softwoods are not discussed.

* * * *

War and Peace

It is becoming increasingly apparent that a large section of the daily press loves the sabre-rattling species of news item. Whether their clients as a whole are equally enamoured of this tendency to foster bellicosity and war psychosis is a moot point, although soaring circulations compel our grudging admission that publicists' poison is still multitudinous readers' meat. An eminent railway chieftain, addressing his very friendly enemies in their own camp, was emboldened to say that wars, controversies and disagreements invariably filled columns, whereas, when peace, concord and harmony reigned, there was "nothing to report"; allowing for a modicum of rhetorical hyperbole, we concur with the illustrious speaker. Wherefore, we trust fervently that, if rail and road, their differences satisfactorily composed, lie down and bask contentedly together in the genial warmth of co-ordination, such a felicitous event will ignite at least a "scintilla" of journalistic comment. No less fervently do we trust that the furnaces of the press will refrain from roaring, if the railways' antagonists, intransigent to the last, maintain that a modified rating structure is a "violation of the status quo," that carrying competitive merchandise is an "act of aggression," and that in short the envisaged "square deal" is (with due respect to geometers) nothing more than economic "encirclement."

Canadian National Railways

A DECREASE in operating expenses of \$4,613,546 or 2.55 per cent., despite a heavy increase in wage and material costs, was effected in 1938 by the management of the Canadian National Railways. This reduction in expenses was not sufficient, however, to offset the decline in gross operating revenues due to the continuation throughout the greater part of 1938 of the recession of general business activity which began in the latter part of the previous year. Gross operating revenues were lower by \$16,154,886 or 8.14 per cent. This reduction in railway revenues marks the first setback from a slow but steady annual increase since 1933. Prospects for 1939 are considered more favourable. Freight revenues decreased by \$14,026,556 or 9.1 per cent., although the increased grain movement contributed to check the decline in revenue in the last quarter. System grain tonnage increased by 1,446,850 tons or 40.5 per cent. Passenger revenues decreased by \$847,918 or 4.5 per cent.

Restoration of wage deductions increased the 1938 expenses as compared with 1937 by \$6,082,000, and another factor affecting expenses was an increase in the price of materials amounting to \$900,000. Allowing for these features there was a reduction in operating expenses of \$11,600,000 as compared with the previous year. This was effected by a policy of holding operating expenses to a minimum, consistent with efficiency of operation and the provision of needed services. Maintenance expenses were reduced to a minimum, but the property and equipment have been kept in good condition having regard to the volume of business to be handled. Taxes paid by the railway in 1938 amounted to \$6,946,873, exclusive of sales tax of approximately \$3,150,000. Total requirements for interest on funded debt held by the public in 1938 were \$49,839,023, and interest payments to the Government on temporary loans for capital purposes amounted to \$926,125. The accompanying table compares figures for the past two years:—

	1937	1938
Average miles operated ..	23,707	23,684
Tons—revenue freight ..	47,037,720	40,577,666
Ton-miles—revenue freight ..	15,165,951,267	14,505,234,204
Average haul, miles ..	322.40	357.47
Passengers ..	10,888,476	10,289,000
Train-miles ..	49,143,537	46,575,844
Operating ratio, per cent. ..	91.12	96.67
	\$	\$
Freight revenue ..	153,796,239	139,769,682
Passenger revenue ..	18,944,767	18,096,849
Total railway revenue ..	198,396,609	182,241,723
Total operating expenses ..	180,788,858	176,175,312
Net operating revenue ..	17,607,751	6,066,411
Net available for interest ..	8,287,228	Dr. 3,549,048
Cash deficit ..	42,345,868	54,314,196

Net operating income from hotels was \$226,014, an increase of \$25,927 over 1937. The agreement covering the joint operation of the new Canadian National hotel at Vancouver was completed on July 28, 1938. The Vancouver Hotel Co. Ltd. was incorporated under date of October 4, 1938, with an authorised capital stock of \$500,000, to be held in equal portions by the Canadian Pacific and Canadian National. The opening date of the new hotel, which will be known as the Hotel Vancouver, has been set for May 25, 1939. It has been agreed between the two companies that subject to approval of the Board of Transport Commissioners additional lines of railway totalling 265.66 miles in length shall be abandoned. Of these lines 161.69 miles are Canadian National, 74.21 miles are Canadian Pacific, and 29.76 miles are Northern Alberta. The longest stretches proposed to be abandoned are the Canadian National 75.19 miles between Hallboro and Beulah in Manitoba, the Canadian Pacific 54.41 miles between McGregor and Varco in Manitoba, and the Canadian

National 37.91 miles between Arnprior and Eganville in Ontario. With regard to the 637 miles previously approved for abandonment, progress has been made in the development of the necessary agreements between the two railways. The Senneterre—Rouyn branch line authorised in 1936 was formally opened for operation on December 3, 1938. It is expected that the opening of direct railway communication with this rich mineralised section will be an important factor in further development of the area. During the year 1938, 148 air-conditioned units were placed in service, and the total number of such units at the end of the year was 401. The programme for 1939 provides for an additional 92 units. Air-conditioned cars operated by the Pullman Company over Canadian National lines number 52.

* * * *

Ancillary Businesses of British Railways

THIS week we publish the first of a series of articles reviewing the working of the seven ancillary businesses of the four main-line railways in 1938. The depressed state of industry naturally had an adverse effect upon these businesses, the total gross receipts from which amounted to £22,817,379, compared with £23,907,976 in the previous twelve months, while the net profit was only £637,493, compared with £1,208,714, a decrease of 47 per cent. For the purpose of clearer comparison, however, it is desirable to divide the seven businesses into two sections, *i.e.*, those which in normal years produce a direct net revenue, and those which inevitably result in a loss. Included in the former category are docks, harbours and wharves; steamboats; hotels, refreshment rooms and restaurant cars; and road transport (as distinct from the collection and delivery services). Gross and net receipts from these sources last year amounted to £17,514,432 and £1,859,857 respectively, compared with £18,385,680 and £2,420,127 in 1937. Details for the individual groups for the last two years are shown below:—

DOCKS, STEAMBOATS, HOTELS, AND ROAD TRANSPORT

	Gross receipts		Net receipts	
	1938	1937	1938	1937
G.W.R. ..	3,183,585	3,421,650	286,166	416,338
L.N.E.R. ..	5,542,705	5,944,268	237,403	501,241
L.M.S.R. ..	5,869,217	6,100,067	580,528	761,808
S.R. ..	2,918,925	2,919,695	755,760	740,740
Total ..	£17,514,432	£18,385,680	£1,859,857	£2,420,127

These figures indicate a substantial decline in gross receipts and an even greater fall in net profit, except in the case of the Southern Railway, which experienced a decrease of only £770 in gross receipts and an increase of £15,020 in net profit.

As was only to be expected, the heaviest decline was in respect of docks, harbours, and wharves, the net receipts from which amounted to £596,749, compared with £1,004,924 in 1937. The L.M.S.R. sustained a loss of £25,088 compared with a profit of £35,247 in the previous year, while the G.W.R. and L.N.E.R. net receipts were very much reduced. This business forms the subject of the article on page 706. Net receipts of the four companies from their steamboat business amounted to £609,962 last year compared with £710,807 in 1937. The L.N.E.R. incurred a loss of £17,928 compared with a profit of £49,027 in the previous year, and L.M.S.R. net receipts fell by £97,608. On the other hand, the Southern Company's profit from this source increased by over £60,000 and the G.W.R. figures also show an improvement over 1937. The business at the companies' hotels and refreshment rooms, and in the restaurant cars, was also affected by the prevailing depression in trade, and, in the case of the hotels, by the competition of the Con-

tinental resorts as a result of favourable rates of exchange. Net receipts amounted to £522,634, a decrease of £53,426 compared with the previous year. The only ancillary business to show any improvement was road transport; net receipts of the G.W.R. and L.M.S.R. from this source were slightly less than in 1937, but the L.N.E.R. and Southern secured satisfactory increases, with the result that the total net revenue of £130,512 was £2,176 more than in the previous year.

The remaining ancillary businesses are concerned with the collection and delivery of parcels and goods; canals; and air transport. Details of the financial results last year compared with 1937 are shown below:—

COLLECTION AND DELIVERY, CANALS, AND AIR TRANSPORT				
	Gross receipts		Net loss	
	1938	1937	1938	1937
G.W.R. . .	1,027,002	1,054,051	272,066	269,254
L.N.E.R.* . .	1,366,994	1,399,295	326,246	416,371
L.M.S.R. . .	2,371,462	2,521,389	633,637	532,287
S.R. . .	537,489	547,561	CR. 9,585	CR. 6,499
Total . .	£5,302,947	£5,522,296	£1,222,364	£1,211,413

* The L.N.E.R. is not directly interested in air transport

Gross receipts declined by over £200,000, and the loss was slightly more than in 1937 owing to an increase of over £100,000 in the L.M.S.R. deficit in respect of collection and delivery services. On the other hand, the L.N.E.R. loss was substantially less, while the Southern, which is the only company to show a profit on collection and delivery services and canals, showed an increase of nearly 50 per cent. in net revenue. The most important of these three businesses is that relating to the collection and delivery services, the gross receipts from which in 1938 amounted to £5,109,766. The net loss was £1,114,398 compared with £1,095,279 in 1937. Notwithstanding the heavy cost of providing these services, the collection and delivery of parcels and goods are indispensable factors in the main business of rail transport and form an essential part of the railway organisation. Canals have no such contributory value and can be regarded only as an unfortunate legacy from the last. They involve the companies in substantial maintenance costs, and the loss last year amounted to £65,570 compared with £64,666 in 1937. The loss on air transport last year amounted to £42,396 compared with £51,468 in the previous twelve months, the reduced deficit being largely due to the transfer of services formerly operated by Railway Air Services on behalf of the G.W.R. to a new company known as Great Western & Southern Air Lines Limited, which also took over the services operated on behalf of the Southern Railway and those run by Channel Air Ferries Limited.

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The New Pennsylvania Locomotive

THE new high-speed locomotive recently completed at Altoona, Pa., for service on the Pennsylvania Railroad, and to be exhibited at the New York World's Fair, is described on page 698. Except in articulated locomotives of the Mallet type and a comparatively few three-cylinder engines, the two-cylinder type has been and still is predominant in American practice. The introduction of a four-cylinder design such as this is therefore of interest as indicating a desire to reduce reciprocating masses, thus avoiding the track stresses that might become too severe at the high speeds for which this type has been designed. So far as tractive effort is concerned, a pair of 31-in. cylinders would, other things being equal, have produced the same power as the four cylinders each 22-in. dia., and moreover could presumably have been

used within the limits of the liberal loading gauge on the U.S. railways. There can, however, be little doubt that the arrangement adopted is far preferable by reason of its lighter motion parts combined with reduced distance between cylinder centres, to say nothing of the sub-division of stresses throughout the engine framing. Even when care is taken in the design of motion parts, powerful two-cylinder engines are apt to develop troubles due to slipping at high speeds, and, moreover, to be hard on the track. Thanks to their great mass and rigidity, however, considerable reductions have been found possible in the percentage of reciprocating parts requiring to be balanced. Had this not been so, it seems likely that designs similar to that now under notice would have appeared before.

Actually this engine has in a measure been anticipated by the Baltimore & Ohio locomotive completed in June, 1937, and described in our July 9, 1937, issue. In the B. & O. design, also, four outside cylinders were used, two at the leading end arranged as usual, and two outside next the firebox, each pair driving a group of four coupled wheels. Four-wheeled carrying trucks were provided at front and rear. In this design it was found possible to keep the overall length of the engine within more conventional bounds than in the present case. The boiler of the new Pennsylvania locomotive, however, is not unduly large when the tractive effort is considered, or when judged by U.S. standards. The evaporative heating surface of 5,661 sq. ft. seems small compared with the tractive effort of 76,400 lb. This gives 13.5 lb. of tractive effort for each square foot of heating surface, comparing with 11 lb. for the "K4s" Pacifics and 10.27 lb. in the case of the new Santa Fe 4-6-4 high-speed engines with 7-ft. driving wheels; the streamlined New York Central 4-6-4 engines described in our issue of May 27 last have a factor of 10.37. In making these comparisons, however, due regard must be given to the proportions of the heating surface and grate area ratios, and it would seem that the new engine has more grate area per square foot of heating surface than the others mentioned. There is no doubt that the engine will be capable of developing a considerable power output, and its distinctive design justifies the name of *American Railways* under which it will represent the latest U.S.A. engineering practice at the fair.

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Reichsbahn Signalling in 1938

MANY new signalling installations, including a number of multiple-row electric power frames, were brought into use last year on the German State Railway, notably at Altenburg, Anklam, Augsburg, Essen, Linz, Lippstadt, Mainz, Giesing, Neudietendorf, Schaftanau, Silz, Weissen-see, Wesel, Wuppertal, and Vienna. A further 25 miles of automatic signalling were opened on the Berlin City and Local lines. Distant signals were moved farther out on additional main-line sections, and A.T.C. was extended, being fitted to a number of level crossings to detect the closing of the barriers in time to protect the approaching train. The improved lock-and-block apparatus, without rigid coupling between rear and advance section portions, has found wider application. On several secondary lines, or *Nebenbahnen*, signalling has been improved to enable higher speeds to be run. Numerous experiments with new technical appliances, including a new form of luminous repeater for signals the view of which is obscured, and a three-position home signal, the arm of which can take a lower quadrant as well as an upper quadrant position, were made. A gas-lighted colour-light signal has also been developed as a special reserve for the total failure of ordinary light signals, but details have not been made available for publication.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

A Unified Colonial Railway Service

April 1

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—Amongst other technical publications, THE RAILWAY GAZETTE is circulated round the officers of the railway with which the writer is connected, and articles of interest are commented on by readers in the margin. The explanatory article on a "Unified Colonial Railway Service" appearing in your issue of December 23 last, by the author of the original article, was an outstanding example, and a *précis* of the annotated remarks may be of interest. It should be remembered that they are made by several different people, so no common argument necessarily runs through them. The comments take the following form:—

(a) What is required is not unification of all Colonial railways but closer co-operation between them.

(b) Each railway may well be a law unto itself in fixing its salary scale.

(c) The grouping of railways in accordance with their size, as proposed originally, is quite illogical. Local conditions of railways vary far more with geography and climate than with size.

(d) The Colonial Office is the body responsible for fixing salary scales. How much weight will the views of "Transportimus Maximus" carry with this body. Are they not just as capable as he might be of devising a sound scheme of, say, a geographical grouping with varying salary scales within each group to allow promotion on transfer.

(e) Does "Transportimus Maximus" consider that no General Manager or head of department ever reads the annual report of a railway other than his own, and try to profit by the information in it, and does he not think that this would be a cheaper way of gaining the same end.

(f) Does "Transportimus Maximus" not consider that the Crown Agents, with their existing technical staff, experienced in such matters, make just as efficient a clearing house of technical development as the newly enlisted staff of his proposals. Does he consider that they make no attempt towards uniformity of technical design. Or is he possibly misled by their fear of going too far in this direction, a wise fear arising from a thorough appreciation of how local conditions alter the case.

(g) Has "Transportimus Maximus" ever roughed out a cost of what the total paysheet of his proposed department would be, and what proportion of the existing European staff of all Colonial railways would have to be retrenched to meet it. And does he consider that the loss of efficiency through this decrease in each railway's working staff would be more than compensated by the co-ordination so effected.

It will be seen that, in spite of the number of people contributing to this anthology, a common thread of argument does run through it; and that the existing machinery can effect the same end without the extra cost that the proposed scheme would entail. What argument against it can be stronger?

Yours, &c.,

"RAILWAYMAN"

Free versus Keyed Wheels

99, Clifton Road, S.E.25

April 2

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—It was interesting to read the letter from Mr. A. S. Gillitt about the coning of wheels in your issue for March 24. But perhaps even greater interest attaches to the question whether any useful purpose is served by the present practice of having the wheels keyed to the axles on both sides instead of permitting independent rotation for at least one wheel. It is not merely that undue torsional stresses are set up, but

also that jarring effects are probably much greater than if the wheels were free to rotate on the axles. It is not even as if the present practice ensured safety, for, at the inquiry into the derailment which occurred at Rutherglen on April 8, 1938, it was revealed that one of the axles of the leading coach contained a fatigue flaw extending over 81 per cent. of the cross section of the wheel seat, flush with, or just inside, the inner end of the wheel boss; and apparently failures of a similar kind, though not attended by such serious consequences, had occurred at the rate of about three per annum throughout the country during the preceding six years.

A former Chief Engineer of the London Midland & Scottish Railway has given a most interesting enumeration of the disadvantages of keyed wheels.* Axles have to be used of nearly three times as heavy a cross section as that required for road vehicles conveying equivalent loads. The whole construction of the wagons or coaches has to be made proportionally cumbersome to withstand the wrenching, skidding, and grinding treatment to which they are subjected by a powerful locomotive when travelling at speed. Far from ensuring smooth running, the use of keyed wheels merely promotes "hunting" and other irregularities of movement. The authority referred to says:—

"It is contended that the modern 'standard' bogie runs in a state of unstable equilibrium and oscillates or lurches between the rails within the limits of the track gauge . . . so that one wheel must always glide or skate. It is estimated that, if a carriage runs 600 miles daily, the keyed wheel-and-axle units run only one quarter of the time on a perfectly straight course, and that each pair of wheels glides or skates 1½ miles during a day's run."*

One may surmise, also, that these unproductive lateral movements, combined with the heavy stresses due to wheels pulling in opposite directions, must have unsettling effects on the track, tending to promote "creep." About the more direct wear and tear there can be no doubt, and the writer contrasts the free and adaptable movement of a train of ten or twelve platform trolleys following almost in the path of the tractor round a quick curve, with the mutual destruction of track and rolling stock in similar circumstances on the railways. For 1933, for instance, it is estimated that the cost of track renewals was some £3,000,000, the upkeep on tyres being presumably about the same, seeing they mutually wear each other out. With such large sums at stake, it should surely be worth the railway companies' while at least to investigate the possibilities of unkeyed wheels, if not to experiment with vehicles of lighter construction altogether, similar to those built of light steel alloys which have been introduced for high-speed work in America and which bring down the weight to 40 per cent. less than that of a standard train.

Yours faithfully,

K. H. JOHNSTON

CONVEYANCE OF HEAVY MACHINERY BY DOVER-DUNKERQUE FERRY.—The largest single machinery consignment on the Southern Railway's Dover-Dunkerque train ferry left Dover last Sunday for the final stage of its journey from Marseilles to Leeds. The load comprised a large dismantled parallel smoothing lathe. Nine open trucks conveyed the beds and small pieces and two large well-wagons of the Northern Region of the French National Railways the flywheel and headstock, the latter needing special facilities for transport. The lathe weighs 180 tons, is 46 ft. long, and has a maximum height of 13 ft. 1 in. The flywheel weighs 9 tons 11 cwt., with a circumference of 13 ft. 1 in., and is 10 in. wide at the top; the headstock, weighing 27 tons 4 cwt., is 12 ft. high and 10 ft. 7 in. wide, an exceptional width to pass over English railways. The special train left Dover at 1.30 a.m. on Sunday, April 23, and travelled via Chatham, Lewisham loop, Clapham Junction, Kew, Willesden, and the L.M.S.R.

* A. Newlands, "The British Railways," pp. 122 to 125.

THE SCRAP HEAP

TWELVE MINISTERS OF TRANSPORT IN 20 YEARS

Sir Eric Geddes	...	...	1919-1921
Viscount Peel	...	...	1921-1922
Earl of Crawford	...	...	1922
Sir John Baird	...	...	1922-1924
Harry Gosling	...	...	1924
Rt. Hon. Wilfrid Ashley	...	...	1924-1929
Herbert Morrison	...	...	1929-1931
P. J. Pybus	...	...	1931-1933
Hon. Oliver Stanley	...	...	1933-1934
L. Hore Belisha	...	...	1934-1937
Dr. E. Leslie Burgin	...	...	1937-1939
Captain Euan Wallace	...	...	1939-

In 1838 the Emperor of Russia imposed a tax on tobacco, the produce of which was to be applied to the formation of railways. An irresponsible correspondent says that this converted a useless smoke into a useful smoke.

Severe flooding in the Northern Territory of Australia recently caused a train from Port Augusta on the Central Australia Railway to be 34 days late on arriving at Alice Springs. The distance is 771 miles. Reading and cards passed the time for some of

the passengers, while children paddled in the water beside the stationary train. In some districts of this normally arid area, children aged three had never seen rain before.

BITING THE HAND THAT FED THEM

The Industrial Transport Association met and dined and talked in Glasgow last night (March 29), and for the most part they talked critically and even a little rudely about the railways and their square deal. The dinner, incidentally, was held in the North British Station Hotel.—*From the "Glasgow Herald."*

An Architect on Railway Stations

Below we publish a few extracts from the paper read by Professor A. E. Richardson, A.R.A., F.S.A. (Professor of Architecture, London University), read before the Royal Society of British Architects last Monday.

As a collector, I possess amongst other things, a sedan chair, a stage coach, the earliest "drachne," and a number of miniature carts and wagons. In the course of my travels I have learned much concerning railways. Locomotion in any form has a fascination for us all, and when we consider the transition from coaching to steam, particularly the changes which then took place, we must admit the extraordinary skill of the Victorian architects and engineers in meeting the new conditions.

English architects and engineers were the pioneers of railway architecture in the early nineteenth century. What finer testimony to their genius can be found than the structural excellence of their conjoint labours: the roads, the viaducts, embankments, cuttings, and tunnels?

The pioneers of steam traction, Trevithick, Stephenson, and Brunel, envisioned an England netted with railways linking the industrial districts to the Metropolis and to the seaports.

The average middle-class Victorian, taking a more domestic view, regarded railway travel as a means of escape from the cities to the countryside.

At the zenith of the coaching era, the coaching inns were near the heart of the Metropolis. It is not surprising, therefore, to account for the location of the earliest North-Western terminal at Euston, of the Great Western at Paddington, of the Great Eastern at Shoreditch, the London & Brighton at London Bridge, and South Western at Nine Elms.

In the 'fifties, when the Great Northern came into London, King's

Cross was the site chosen, and this enterprise was followed eighteen years later by the Midland coming to St. Pancras. Charing Cross, Cannon Street, Victoria of the 'sixties, and Marylebone of the 'nineties, were the late-comers.

The exigencies of Victorian London thus created a ring of terminal stations suited to the requirements of the centre of the Metropolis and the inner suburbs. It was not long before London proceeded to go out of town with a vengeance. You can trace the Victorian villa in all directions in proximity to the railway thirty miles from town.

To my way of thinking the Metropolitan terminal is in the obsolescent stage. Shall I offend if I suggest for the consideration of those in a position to take action, that the terminal of the future should be ten miles out? This does not imply that we should journey by cab or car to the terminal but rather that a centure railroad serving the terminal stations should form part of the scheme.

The earliest station in England was nothing more than a walled enclosure; I refer to the "wharf" at Princetown on Dartmoor which received the horse-drawn trucks that came on the rails from Plymouth.

"A TERMINAL OF DISTINGUISHED APPEARANCE"

It was not until the year 1837 that London possessed a railway terminal of distinguished appearance.

Philip Hardwick, who was commissioned to design the station buildings, conceived the layout of the terminus of asymmetrical lines, the Propylæum, with the attendant lodges, forming a monumental frontispiece to the courtyard with which it was not en-axe. The station proper, with the low iron and glass roofs over the arrival and departure platforms, stood to the left. It will be of interest to many that these original roofs and waiting rooms are still in being. It was in accord-

ance with the classic revival that the theme should be Greek Doric, and it followed in strict propriety that the terminal features at Birmingham should be Greek Ionic.

The fact that the vertical gauge of the line for rolling stock was determined by the tall funnels of the early locomotives made possible the development at the close of the nineteenth century of Webb's famous locomotive engines and today the proportions of the Coronation Scot.

Paddington is a two-part design, namely, the train shed and the hotel. The construction of the former, with its cast-iron columns, embellished with Moorish detail, and the trellised vallance at the west end is as deserving of a place in the annals of the iron order as prominent as Joseph Paxton's masterpiece. The Victorian engineer was not only consistent in his schemes but he understood how to make things last. This is one of the finest of the crinoline roofs and deserves preservation within a glass shade. Whatever happens to the station, Frith's painting ensures its fame, and posterity will delight in the waxen figures and toy-like train. What a theme this station provided for the picture book of the Victorian child, and even modern children tolerate it with mild respect.

Hardwick was certainly a versatile designer, Greek Doric at Euston, Tudor at Lincoln's Inn, French Renaissance at Paddington, and Elizabethan elsewhere. It becomes clear that the railway companies in Victorian days were governed by directors who wished to endow the country with the best that could be obtained in the way of architecture. Lapses into semi-Italian at Chester, Cambridge, Huddersfield, and Manchester accord with the dictates of contemporary fashion.

"THE FINEST STATION IN LONDON"

When King's Cross was built in 1854, forty-five acres of land were allocated for the purpose of the station, the hotel

and the approaches. The station was designed by Lewis and Joseph Cubitt. It consists of two main barrel sheds each of 105 feet span. The duality of the arched elevation is retrieved by the central clock tower 120 feet high. Each train shed is 800 feet long. There can be no doubt of the fact that this is the finest railway station in London. . . . It would look positively marvellous if it were to be whitewashed, and if we could ask the railway company for a square deal we might be rewarded by having the frontage cleared of those nondescript sheds which for the last 50 years have disgraced the station.

* * *

St. Pancras le vault, or St. Pancras le Gasometer, might be chosen as the name for Barlow's masterpiece which is so completely masked by the guardian hotel. This magnificent vault of steel and glass is 700 feet in length, 240 feet wide, and 100 feet high. The span of the roof covers four platforms, eleven lines of rails and a cab stand 25 feet wide. The roof contains two and a half acres of glass. The Gothic formation of the

roof much intrigued Sir Gilbert Scott, who was pleased to find something suitable to receive his great frontispiece.

* * *

From London to Bedford the stations are on the Gothic model and from thence to Derby and Manchester they change to Classic. For why? The old Midland line belongs to the period of the 'forties and the extension to London coincides with the last phase of the Gothic Revival.

* * *

It may appear curious that the old architect and engineers thought fit to build their terminal stations of timber. Such was the case when the original station of the Eastern Counties was built at Shoreditch. Another instance of this predilection for vegetable construction was the wooden shed at Nine Elms, which for a time served as the London terminus of the South Western Railway.

* * *

Eventually Nine Elms was replaced by Waterloo, with its drab brickwork of 1853. The new Waterloo, which in-

herits the awkward placing of the old station, has the distinction of a fine steel and glass roof of moderate height. It is one of the best lit of the more recent stations and is certainly spacious.

* * *

On a rough computation there are over 350 railway stations within the Metropolitan area. Actually there are sixteen which can be classed as terminus. In my survey I must include the Gothic externals of Liverpool Street, the spiky roofs of Broad Street, and the cavernous vault of Fenchurch.

* * *

In Eire, railway architecture of the 'fifties of the last century rose to great heights. There is the splendid terminus at Broadstone, Dublin, which Mulvany designed in 1854. Sancton Wood designed the Kingsbridge station and built it in granite. Harcourt Street is in the form of an Italian loggetta, and Amiens Street is also Italian.

* * *

We hope later to publish some of Professor Richardson's comments on Continental and American stations.

PUBLICATIONS RECEIVED

Liechty's Lokomotivsystem für grosse Fahrgeschwindigkeiten und dessen Vorgeschichte (Liechty's Locomotive System for High Speeds and its Antecedents). By H. Liechty. 1939, Bern: Verlag A. Francke A.G. 11½ in. by 8½ in. 59 pp. 109 ff. Price not stated.—This book is based on the premise that to cope successfully with the competition of road transport, the railway locomotive must be made smoother in running, thus reducing the cost of maintenance of rolling stock and permanent way, and permitting operation at higher speeds. A large part of the volume is devoted to a history of locomotives with special reference to the arrangement of carrying and driving wheels as regards the guiding of the locomotive on curves and the provision of flexibility by side-play or articulation. Concerning the Liechty system, which is dealt with mainly in the last 20 pages, it is said that the Liechty articulated locomotive for high speeds is distinguished by the use of spring-controlled restoring devices to control the position and guiding of the locomotive on the track. Either by omission of flanges on the driving wheels or by adequate side-play of the latter, all tendency to cut the rails is avoided. The cylinders are mounted on swinging frames supported by the driving axles, end bogies and a centre frame resembling a bogie but with no centre pivot. The boiler is mounted on a main frame carried by the swinging frames; and the restoring gear acts between the pivot of the end bogie and fixed points on the main frame.

The author's general description and claims are illustrated by a few wheel-arrangement diagrams and track plans showing the position of proposed Liechty

locomotives on curves, compared with the positions of corresponding locomotives of conventional types. Without belittling the interest of the book as an historical presentation of a particular line of evolution, it may be suggested that a more useful purpose would have been served by dealing more fully and specifically with the author's proposals.

University of Illinois Bulletins.—

The following bulletins have been issued by the Engineering Experiment Station of the University of Illinois, Urbana:—

Circular No. 36. A Survey of Sulphur Dioxide Pollution in Chicago and Vicinity. By Alamjit D. Singh. Price 40 cents.

No. 307. An Investigation of Rigid Frame Bridges, Part I. By Frank E. Richart, Thomas J. Dolan, and Tilford A. Olson. Price 50 cents.

No. 308. An Investigation of Rigid Frame Bridges, Part II. By Wilbur M. Wilson, Ralph W. Kluge, and John V. Coombe. Price 85 cents.

No. 309. The Effects of Errors or Variations in the Arbitrary Constants of Simultaneous Equations. Price 60 cents.

No. 310. Fatigue Tests of Butt Welds in Structural Steel Plates. By Wilbur M. Wilson and Arthur B. Wilder. Price 65 cents.

The last-mentioned bulletin, No. 310, is especially interesting to railwaymen in these days when welding is being extensively used in railway construction. The tests were made on plates ¾ in. thick and from 5½ in. to 6 in. wide where the weld occurred. For one series the plates were of carbon steel; for a second series of silicon steel. Some of the carbon-steel specimens were welded by an automatic carbon arc process; for all the other

specimens the welding was done by a manually-operated metallic arc. For all tests the specimen was subjected to an axial stress that varied from zero to a maximum tension.

Guides to Technical Literature.—

The literature of technology now covers an enormous field, and those desiring to make the best use of the available published information will learn with pleasure that Grafton & Co., of Coptic House, 51, Great Russell Street, London, W.C.1, is publishing "A Guide to Technical Literature," by A. D. Roberts, F.L.A., Librarian, Technical Library, Birmingham. Another volume announced for publication by the same firm is "Three Thousand Books for a Public Library: Some Significant and Representative Works for Basic Stock," by W. A. Munford, B.Sc., F.L.A., Borough Librarian, Dover. A special feature is also made here of the selection of technical works.

City of Birmingham Handbook.—

Another edition of this annual illustrated handbook issued by the City of Birmingham Information Bureau has now appeared. It has now grown to an imposing limp-covered volume of 352 pages, in which the reader will find the story of how Birmingham evolved from a Roman military centre to a market town and now an industrial capital. Succeeding pages deal in detail with the numerous services of the corporation, which is laying the foundation for an enduring Birmingham of enthusiastic and responsible citizens by unrelaxing care for the welfare of its people from childhood, through school-days, to the envied status of ratepayer. In the Civic Undertakings section of the handbook will be found historical and statistical details of the Transport Department, and an account of the construction of a municipal airport.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

UNITED STATES

The New Spirit of St. Louis

The first 20-hr. train service between St. Louis and New York will be established on April 30, when the Pennsylvania Railroad's Spirit of St. Louis will inaugurate new and faster schedules from St. Louis to all the eastern cities served by the system. The time from St. Louis to Philadelphia will be cut to 18 hr. and 29 min., to Baltimore 19 hr. 33 min., and to Washington 20 hr. and 25 min., in each case the fastest from St. Louis over any route. The saving in running time will be effected by reducing time at terminals and division points, while retaining the smoothness and comfort in riding of the present maximum speeds, commensurate with the highest safety standards.

All-room Pullman service will be provided exclusively in the New York part of this train, substantially duplicating the appointments and facilities of the Chicago—New York streamlined Broadway Limited, and will include single-berth cars of the roomette and duplex types, and luxurious double bedrooms, modern compartments, and drawing rooms, a cocktail bar, an observation car, and a lounge car in the middle of the train.

The Baltimore—Washington cars of the new Spirit of St. Louis will include compartments, double bedrooms, drawing rooms, modern upper and lower Pullman sections, and through coach service in modern style reclining seat cars.

New Eastbound St. Louisan

As from April 30, an additional east-bound train, to be known as The St. Louisan, and constituting a counterpart of the well-known westbound train of that name, will be introduced. It will run from St. Louis to Philadelphia and New York to the present schedule of the Spirit of St. Louis, including the latter's connection from Cincinnati, but will not include Baltimore or Washington cars.

This train will embody standard type Pullman accommodation to Philadelphia and New York, including modern upper and lower berths, compartments, drawing rooms and lounge car service, with the additional feature of through modern type reclining seat coach service from St. Louis to both eastern cities.

New Daylight Trains

Two additional streamline trains for Daylight coast runs between San Francisco and Los Angeles have been ordered by the Southern Pacific Railroad, and are estimated to cost about a million dollars (£200,000) each. They will be hauled by locomotives similar

to those now used for the two present Daylight trains. Though generally resembling the present units the new trains will have certain changes in style and arrangements, including the introduction of a three-car articulated dining set, with a full-length kitchen car in the centre; serving a diner at one end and a coffee-shop car at the other. New luggage compartments in each chair and parlour car will allow of the loading and unloading of baggage at terminals without congesting car aisles. The passenger cars will be 81 ft. long against the 79 ft. 2 in. of the present cars.

AUSTRALIA

Remarkable Effect of a Flood

The past summer has been most abnormal throughout the Commonwealth. The intense heat in the South, with record temperatures of 117° at Adelaide, 114° at Melbourne, and 113½° at Sydney, and the most disastrous forest fires [already described in these columns—Ed. R.G.] was accompanied by a succession of deluges of almost unparalleled severity in the centre of the continent. Here, as in Victoria, the railway suffered serious damage. The Central Australian section of the Commonwealth Railways System from Quorn to Alice Springs has been out of commission on three separate occasions on account of floods for periods of over a week. To give some idea of the damage caused, it may be mentioned that one section of the line near Pedrika—about 750 miles north of Adelaide—was attacked by floods from the Hamilton River, and 200 yd. of the track was converted into a huge corkscrew consisting of four complete spirals [as illustrated on page 702. See also editorial comment on page 679.—Ed. R.G.]

VICTORIA

Microphones for Traffic Control

All the country train despatchers' desks in the Central Traffic Control at Spencer Street station, Melbourne, are now fitted with microphones instead of breast telephones. This innovation has proved most effective. Each desk has a loud-speaker (receiving) set which greatly assists the train despatcher in compiling the necessary records on the graphs. It is claimed that the Victorian Government Railways were the first to use microphones in this manner, and they have received numerous inquiries from leading overseas railways and engineering enterprises for details of the installation and the way in which the many problems associated with its effective use have been solved.

Considerable amplification is necessary for both loud-speaker and microphone, and, as these sensitive instruments must be close together, the elimination of interference between them has been one of the main problems overcome by the engineers.

Cost of Bush Fire Damage

Rehabilitation of railway property destroyed and damaged by the recent bush fires—already described in these columns—will involve an expenditure of over £18,000, exclusive of the loss of the two Alpine rest-houses controlled by the Railway Department.

INDIA

B.B. & C.I.R. Miniature Railway Exhibit at Fair

The Bombay, Baroda & Central India Railway exhibit at this year's (5th) Indian Industries Fair, which opened on March 16, takes the form of a passenger-carrying miniature railway about ¼-mile in length with a station modelled upon Bombay Central. The station, which is lit by neon lighting, serves the double purpose of an enquiry office and as a station for the miniature train, which is in the B.B. & C.I.R. livery of chocolate and cream, and is hauled by a 4-6-0 American type of locomotive bearing the name *The Flying Ranee*. The Governor of Bombay and Lady Lumley visited the fair on March 26 and travelled on the railway, which is proving an attraction to thousands of visitors daily.

On page 702 are illustrations of the miniature station and railway.

CHINA

Summary of the Railway Position

The most recent news of the railway construction programme in Western China is that the total length of line is 3,500 km., of which 360 km. have now been opened for traffic. Meanwhile, over 6,500 km. of the former Chinese railway system are now in Japanese hands, and only 3,200 km. remain under Chinese control. Optimists hope that the Yunnan—Burma line will be open early in 1940.

Guerillas Concentrate on Destruction of Railways

Systematic destruction of railways all over Japanese-occupied China is the principal feature in the programme of the guerillas, directed from the Chinese headquarters at Chungking. Sapper officers have specific areas allotted to them and with the help of permanent way gangmen are blowing up bridges and troop and material trains, setting fire to barracks and other buildings occupied by the Japanese forces. The former amateurish methods of a more haphazard nature using black powder for demolition have now given way to carefully-planned raids on strategic points and destruction with high explosives. For instance, on February 18 a co-ordinated

series of simultaneous raids was made on the Peiping—Hankow, Tientsin—Pukow, Peiping—Suiyuan, Peiping—Liaoning, and Chengtai Railways. Seventeen sections of line were torn up or bridges blown up.

The guerillas are making their own rifles, hand grenades, &c., from rails in numerous small arsenals all over the country, to supplement the rifles and machine guns taken from Japanese outposts along the railways, which are easy prey to large guerilla bands. Telegraph wires are being cut daily and used for many purposes, and the supply of rails and wire is inexhaustible, as the Japanese quickly replace those removed by the bands.

Material for Yunnan-Burma Railway

Messages from Hong Kong report that large quantities of materials which have been stored there are now being shipped to Rangoon for the Yunnan—Burma construction. The shipment, in specially chartered steamers, will occupy a period of two months. The materials have been at Hong Kong since the fall of Canton.

MANCHUKUO

S.M.R. Builds Commemoration Sanatoria

To commemorate the 30th anniversary of the founding of the South Manchuria Railway, the company has built five new sanatoria for tubercular patients, at Mukden, Hsinking, Dairen, Fushun, and Harbin, at a cost of Y. 1,500,000 (about £900,000). The first three each have accommodation for 100 and the other two for 50 patients, and all are equipped with up-to-date medical and clinical facilities. Very low fees will be charged and the sanatoria will be of great benefit to the country generally.

PORTUGAL

The National Railway Company

Though still nominally independent, the National Railway Company operates under close State supervision. It works three separate sections of line: (1) the line branching off from the Beira Alta Railway at Santa Comba and running to Vizeu, and (2) and (3) narrow gauge branches taking off the Oporto—Douro line at Tua for Bragança, and at Pocinho for Duas Egrejas. The combined lengths of these three lines is 356 km.

The Tua—Bragança section is a steeply-graded 135-km. line, climbing most of the way to the cathedral city and provincial capital of Traz-os-Montes (Across the Mountains). On this branch there is only one regular through daily train, which takes 5 hr. 19 min. for the 83 miles, but there is a slightly faster train three times a week, and another train runs part of the way only.

The Pocinho—Duas Egrejas (Two Churches) branch is 64 miles in length,



Sketch map showing the three isolated sections of the National Railway Company of Portugal

and is served by one mixed train each way daily, which, with 17 intermediate stops, covers the distance in the nominal time of 4½ hr. Due to shunting at stations, a two-hours late arrival is not uncommon. The line climbs sharply with many spiral curves in the first 8 miles from Pocinho to Moncorvo, a distance for which 42 min. are allowed.

ARGENTINA

German Rolling Stock for State Railways

For some time past rumours have been current in Argentine railway and commercial circles that a barter agreement was about to be concluded between Argentina and Germany, whereby the former would supply the latter with wheat and wool in exchange for locomotives and rolling stock. This has now been officially confirmed in an announcement by the Ministry of Foreign Affairs, issued to the press, to the effect that a contract for the supply of 64 locomotives and 900 rolling stock units—comprising passenger coaches of various types, and goods wagons—and other materials for the State Railways, has been awarded to Germany, in return for which the latter has agreed to purchase, within a maximum period of six months, 100,000 tons of wheat and 8,000 tons of wool to the total value of some \$14,000,000 paper, in addition to the normal purchases of these products by Germany.

The very brief official announcement on the subject is so vaguely worded that it is difficult to judge whether the deal is a case of barter pure and simple—although this seems to be the view generally held by the press and in commercial circles—or a normal international commercial transaction. But the arrangement has been severely criticised on various grounds, one being that the order for the railway equipment was not thrown open to public tender in the usual way, and as established by law.

More Locomotives for State Railways

In addition to these locomotives from Germany, the State Railways

have been authorised by Government Decree to purchase 15 locomotives of the Santa Fe or 2-10-2 type, at a cost of \$2,099,845 paper.

Transandine Railway Capital

According to a press announcement, the invested capital of the above railway on June 30, 1938, has been fixed by Government Decree at \$8,661,275 gold, as the result of the revision of the company's accounts and documents, under the provisions of Law 5,315.

SPAIN

Public Works Programme

In an interview accorded to a representative of the Madrid daily *A.B.C.*, the Minister of Public Works referred to the meeting of the Council of Ministers in Burgos on April 5, when the public works programme was submitted to General Franco. The Minister, Señor Alfonso Peña, said the plan was founded on considerations of real utility, and not on any scheme of providing work, or political influence. The programme provides for the construction of 625 km. of main roads, 2,000 km. of secondary roads, and 10,000 km. of local roads. Existing roads will be improved and widened to three new standard widths, 9, 7, and 6 m. respectively. Road-rail level crossings will be eliminated wherever possible on the main roads.

As regards the railways, execution of the plan has already begun and it will be carried out in co-ordination with that of the roads. The Minister referred to the situation of the railways at the end of the war. Of 3,000 locomotives, he said, only 1,700 remained, and of these 700 required general repairs. The Government had agreed on the necessity for accelerating work in the workshops engaged in the construction of locomotives and rolling stock, of which 1,000 engines and 3,000 wagons are immediately required. The Minister also described the projected port and harbour improvements, and the vast programme, to be extended over several years, of irrigation works, with subsidiary power schemes.

ITALY

New Stations in Rome

To cater for the growing traffic in Rome five new railway stations are to be built in time for the World Exhibition, which is to take place in 1942. The existing Termini station is to be demolished and replaced by a monumental structure with a 720-ft. façade in Travertine marble and a portico with double row of columns and decoration in various kinds of marble. The ruins of the historic 4th century wall hidden by the present station will again be exposed. The other four new stations are for local and goods traffic, but are to be so placed that they can be used to relieve the main passenger station in exceptional pressure of traffic in emergency.

THE L.M.S.R. LOCOMOTIVE TEST RUNS

A comment on the coal and water consumption figures

(From a Correspondent)

IN the summary of results obtained on the remarkable test runs between Crewe and Glasgow, L.M.S.R., described in THE RAILWAY GAZETTE of April 14, there is much of interest as well as some questions requiring answers. The figure which immediately calls for attention is the average coal consumption, given as 3.12 lb. per drawbar horsepower hour. The corresponding figure for the run from Euston to Glasgow on June 8, 1938, with a train of 232 tons carrying members of the Institution of Locomotive Engineers, a consumption of 3.32 lb. is given which at the time one was willing to accept with so light a train and such a big engine. Why, with a train two and a half times heavier at much the same speed, is the coal consumption referred to the drawbar practically the same, while the water figure falls from 31.6 to 24.15 lb. per d.b.h.p.hr.? Is it due to a relatively large drop in the boiler evaporative efficiency at the higher mean firing rate of 75.7 as against 33.4 lb. of coal per sq. ft. of grate per hr. on the former occasion, or is the steam consumption relative to the total work done, that is in relation to the cylinder horsepower, higher than on the previous trip, or again to a combination of both?

It may be argued, and with some truth, that the conditions are not comparable. But are they so very different? On the trip now in question we have a 604-ton train at 55 m.p.h. requiring a mean "pull" of 8,250 lb., giving a train resistance of 13.6 lb. per ton. The mean power was 1,210 d.b.h.p. Now take the lighter train: In this case the mean pull is 3,180 lb., corresponding to a train resistance of 13.7 lb., practically the same figure, and in this case about 24 per cent. greater than the resistance of L.M.S.R. coaches on the level.

These figures are interesting, and seem to show that it was, in the case of the London—Glasgow trip, the work done between Crewe and Glasgow that counts, bringing,

therefore, our comparison within the realms of reason. It may be added that the mean power for the 232-ton train was 503 d.b.h.p. The water taken from the tender tank and apparently evaporated works out at 29,311 lb. per hr., or a fraction over 10 lb. per sq. ft. of evaporative heating surface. In considering this figure, however, two major points must be appreciated: In the first place the boiler actually evaporated appreciably more on account of that returned by the exhaust steam injector; and in the second place a proportion of the total actual evaporation was lost through the continuous blowdown. How near these two balance each other we do not know. Taking the evaporation as given, there is a final point worth mention. It is, however, based on a certain amount of supposition. The tabular statement II (page 616) gives certain computed cylinder powers which have prompted consideration of what the mean i.h.p. developed might have been. Calculating from the resistance of L.M.S.R. engines, and assuming that the figure for running on the level at 55 m.p.h. is, like that for the coaching stock, increased some 36 per cent., it would appear that the engine itself required about 520 h.p., making a total of 1,730 i.h.p. for the mean cylinder power. This gives a steam consumption of 16.3 lb. per i.h.p.hr. based on the apparent evaporation, which sounds about right, because it must be borne in mind that periods of working very hard on the up grades at 30 and 40 per cent. cut-off must materially affect this figure. In other words the water figure of 24.15 lb. given is reasonably understandable. There is, however, more doubt about the coal consumption, though the truth is that it is difficult to judge locomotive performances with no more information than just the fuel and water consumptions. The remarks made relative to the rate of evaporation are in themselves quite sufficient to support this contention.

TOWARDS SELF-SUFFICIENCY ON ITALIAN STEAM RAILWAYS

Successful results of comprehensive programme for reducing fuel and material costs in steam locomotive operation on the Italian State Railways

SIGNOR J. JACOMETTI, Chief Mechanical Engineer of the Italian State Railways, has described in a recent issue of the *Rivista Tecnica delle Ferrovie Italiane*, the steps taken on those lines in recent years, as part of the self-sufficiency campaign to reduce the amount of fuel, lubricants, and other materials, particularly those imported in connection with steam traction. Notwithstanding the extension of electric and diesel services, steam locomotives still play a very important part in Italian railway working; there were no fewer than 3,266 in service and 980 in the shops on June 30, 1938. In the financial year 1937-38, 1,870,000 tonnes of coal were consumed for traction alone. Although steam services will be progressively reduced, they must play a large part in the working for a long time yet, and every way of reducing the consumption of materials is of importance. The following programme has therefore been carefully carried out with most beneficial results.

In order to reduce the amount of expensive materials

employed in locomotive construction and maintenance, the general question of design was thoroughly reviewed. By June 30, 1938, the number of separate types of locomotive had been reduced to 82—it was 273 in 1905—and a further 16 types will shortly be eliminated, leaving 66, all of modern and efficient design. Modern methods of machining, welding, fitting, and so on, have been introduced everywhere in the shops. A particularly interesting point is that all-welded steel fireboxes have entirely superseded copper, thereby reducing the cost by 80 per cent. and the weight by 30 per cent. A large annual saving of copper has thus been achieved. As the production of lead has largely increased in Italy of late years, the use of tin is also being reduced, and, wherever possible, lead substituted in various alloys. Improved designs have enabled bearing metals to be cut down in quantity. A determined effort is being made to eliminate as early as possible articles constructed abroad under foreign patents. There are about 3,000 speed recorders, obtained from

abroad, for which spare parts have hitherto been similarly obtained. These are now being made in Italy in special workshops at Bologna, where a certain number of new recorders has also been constructed at a very economical figure. The same workshops deal with pneumatic tools.

The principal measures to reduce coal and oil consumption have been, first, technical, through the introduction of better fireboxes and lubricating equipment, as well as improved steam distribution; and, secondly, administrative, involving a more intensive use of locomotives and a higher standard of knowledge among drivers. Premiums for effecting a saving in fuel are granted, and detailed instruction given by qualified staff showing locomotive men how to manage the firing to the best advantage. It is estimated that 20,000 tonnes of coal have been saved in twelve months by this means.

As regards lubricating material, in 1922-23 the consumption amounted to 82 grammes per loco-kilometre, but this was reduced to 22 gr. by 1925 and has now fallen to 15.8, resulting in an annual saving estimated at 20 millions of lire. The number of hot boxes has likewise been reduced in a remarkable manner. In 1914 there were 12,853 cases, or 3.91 per million axle-kilometres. Poor maintenance during the war raised the figure to 11.54, but in 1937 it had fallen to 0.49. For bearing purposes, about 85 per cent. less tin is now imported than in the first years after the war, and the staff engaged on lubricating vehicles has been reduced by 250 men. Fibrous material for oil pads and feeders has been substituted for cotton to some extent. These improvements are considered to save 8 million lire annually.

The extension of other forms of traction has left a surplus of steam locomotives and no more need be built for some time; nevertheless, those available are being modernised wherever increased efficiency justifies. Superheating is almost always applied, boiler pressures are being raised, and feedwater heating is generally adopted. Caprotti valve gear is now in use on 335 engines. Streamlining is being fitted to an express engine.

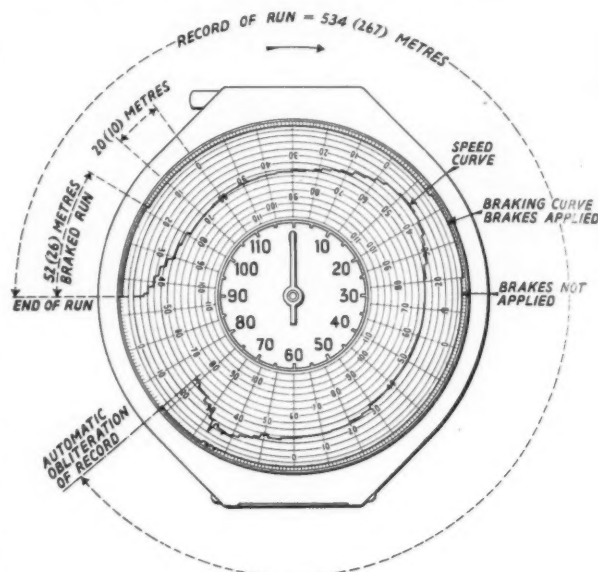
Calculations show that the coal consumption was 1.62 kg. per i.h.p.hr. in 1914. This has been reduced to 1.14 kg. at the present time, a gain of 30 per cent. Attempts to use home-produced fuel formed into briquettes have proved satisfactory, at least for shunting and secondary services, and as the fuel available in Italy is not very suitable for burning in copper boxes the use of steel fireboxes has facilitated this. Such fuel is, of course, largely used in the power generating stations. Improved grate and blast-pipe construction has made it possible to work all the lines in Sardinia, where there are no tunnels, by locomotives using home-produced fuel, and so avoid importing coal.

Faster Freight Trains in the U.S.A.

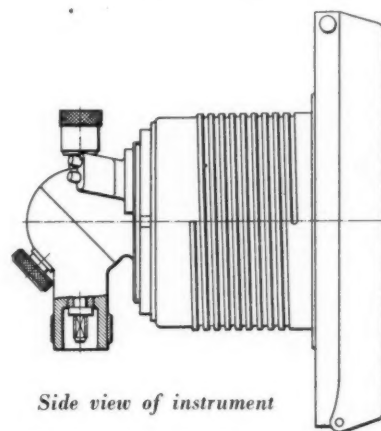
America, like Great Britain, has in recent years been speeding-up her freight trains, and many are now operating on what were formerly passenger schedules. Mr. J. J. Pelly, President of the Association of American Railroads, maintains that in 1938 the railways of the United States set up a new high record in the average speed of freight trains. In that year the average distance travelled by each train *per diem* was 398 miles compared with 386 miles in 1937 and 247 miles in 1920. Produce from California now takes four days less to reach the eastern seaboard markets, and overnight runs of as much as 500 miles are made. Improvements in rolling-stock construction, in signals, and in methods of operation, have made possible these increases in speed.

A New Speed Indicator and Recorder for Locomotives

THE drawings reproduced show the latest type of locomotive speed indicator and recorder introduced by the Hasler Telegraph Works of 26, Victoria Street, Westminster. It is known as the Tel R. 1038, and is driven by flexible shafting. In the centre is a pointer and dial indicating the speed in miles or kilometres an hour. On



Recording disc with diagram. Inner curve shows record of speed, outer curve shows record of brake application



Side view of instrument

the outside of the dial is a circular scale on which is recorded the last 500 yards or metres travelled and brake application. The record is automatically cleared as the scale rotates and, consequently, when the locomotive stops a record remains on the chart of the speed attained during the last 500 yards or metres. This is of particular service in case of accidents or derailments. If desired, the chart can be removed for examination in the office and a spare chart fitted to the instrument. If it is not desired to remove the chart it will automatically clear itself as soon as the instrument is again in operation, the recording of the last 500 yards continuing automatically.

ELECTRIC LIGHTING FOR MECHANICAL SIGNALS

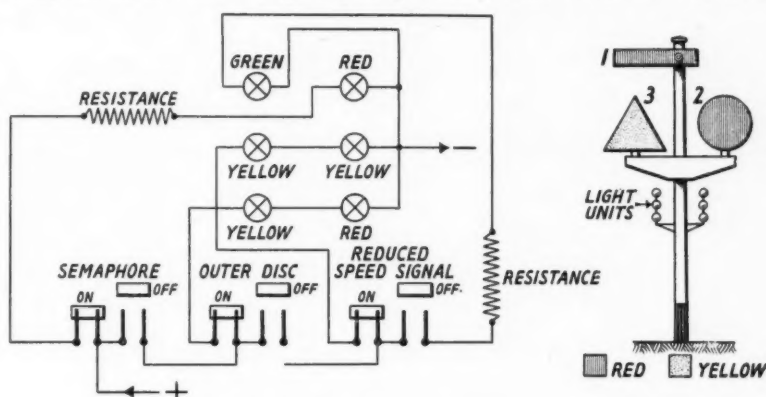
Electric lamps have been applied to over 10,000 mechanical signals in the South-Eastern Region of the French National Railways

STEPS were taken by the French railways in 1934 to give effect to the new *Code des Signaux*, accepted by the government in August, 1930, and superseding the *Code* instituted in 1885.* An important part of the work consisted in adding fittings to the signals to provide a green "line clear" light in place of the white light previously used. Most of the signals were of the disc, or target, pattern in which the coloured glasses for the "on" indication were generally in the disc itself, leaving the white light of the lantern exposed when the disc was turned parallel to the line. Some spectacle attachment had therefore to be added to produce a green light instead of the white. Where signals were combined together, similar to stop and distant signals in Great Britain, a frequent occurrence in busy areas, no slotting mechanism was as a rule used. When, as often, they appeared together, the coloured lights over-ruled the white. It was desired to eliminate this contradictory practice in the new signalling and show, at any given moment, only the most restrictive aspect intended to be conveyed by the combined signals. To do this, however, would have necessitated in some cases rather complicated spectacle and blinder mechanisms, to avoid which, if possible, would be a great convenience. The difficulty was increased by the use of two lights for some aspects and one for others. By using electric lights, however, the desired end could be attained very simply. As explained in our article referred to above, the former P.O.-Midi lines—now the South-Western Region of the National Railways—decided to follow this course. So also did the P.L.M., and Monsieur P. Gaillard, engineer for electrical work on the track, gives particulars of what has been done to date in the *Revue Générale des Chemins de fer* for January, 1939.

After considering the use of acetylene, and investigating the financial side of the matter, it was decided to adopt electric light for all signals on important main routes and all cases of combined signals. On less important lines the outer (red disc) signals were to have long-burning oil lamps. In stations electrically lighted the signals were to be so lighted; elsewhere by oil. The following signals and signs have been fitted with electric light in accordance with this programme: 1,332 outer (red disc) signals; 1,702 absolute stop signals; 1,438 semaphores (single and double); 799 distant signals; 2,309 groups of combined signals; 238 direction indicators at junctions; 88 reduced speed signals; 1,875 siding and shunt back signals; and 1,017 warning signs of various kinds, a total of 10,798. Changing the signals to conform to the new code cost fr. 45 million, of which 17 millions were for the lighting. A saving of four millions per annum on maintenance has been effected.

* Detailed in an article in *THE RAILWAY GAZETTE* for November 22, 1935, page 867

It was decided to adopt trickle-charged lead type accumulators, with rectifier feed, for the principal signals (5,078 in all) at stations having an electric supply, and for the subsidiary signals direct transformer supply without accumulators (558 signals). The remaining 5,162 signals were to have primary batteries using the AD218N type of cells. As the average voltage of each accumulator was 2.15, a nominal voltage of 4.3 was selected for the lamps, the wattage requiring to vary from 1.5 to 2. The num-



SIGNAL INDICATIONS

SIGNALS 1, 2, 3 'ON'.....BLOCK SIGNAL STOP.....RED LIGHT
 SIGNAL 1 'OFF'; 2 & 3 'ON'.....DEFERRED STOP.....YELLOW LIGHT AND RED LIGHT
 SIGNALS 1 & 2 'OFF'; 3 'ON'.....REDUCED SPEED.....TWO YELLOW LIGHTS
 ALL SIGNALS 'OFF'.....PROCEED.....GREEN LIGHT
 (THE MOST RESTRICTIVE ASPECT IS ALWAYS ILLUMINATED, WHATEVER THE POSITIONS OF THE SIGNALS)

Diagram showing control of light units with combined signals

(The signals are not slotted with each other mechanically)

ber of accumulators at each signal varies from 2 to 4, according to the aspects involved. For primary battery working a range of lamp wattages, from 0.6 to 1.8, at a nominal voltage of 2.4, was selected to suit varying degrees of horizontal spread; a 1.8 watt lamp was to be used for all signals fed from a power supply.

The following table gives the photometric and other characteristics of the lamps:—

Types of lamp		Limits of electrical characteristics at nominal voltage			Minimum life in hours
Nominal volts	Nominal watts	Lumens	Watts	Lumens per watt	
		Per cent.	Per cent.	Per cent.	
2.4	0.6	2.3 ± 15	0.6 ± 6	3.85 ± 10	1,500 at 2.7 volts.
2.4	0.85	3.5 ± 15	0.85 ± 6	4.15 ± 10	Do.
2.4	1.0	4.4 ± 15	1.0 ± 6	4.4 ± 10	Do.
2.4	1.2	5.6 ± 15	1.2 ± 6	4.7 ± 10	Do.
2.4	1.8	9.5 ± 10	1.8 ± 6	5.3 ± 8	Do.
4.3	1.8	9.5 ± 10	1.8 ± 6	5.3 ± 8	1,500 at 4.8 volts.

At first the lamps tried gave neither a long enough life nor a sufficiently even degree of reliability, but improvement in manufacturing processes eventually enabled a satisfactory type to be obtained. The bayonet caps have four pins, the last being secured after the lamp has been perfectly finished in all other respects.

Signal Lens Units

In view of the low power of the lamps, special attention was given to the design of the signal lamp fittings and lenses to ensure satisfactory results. The use of one type, affording sufficient horizontal spread for all situations, was not considered advisable and five patterns have been standardised, viz:—

Spread	Lamp Watts
3 or 6 deg.	0.6
12 deg.	0.85
18 "	1.0
24 "	1.2

The vertical spread is 1.5 deg. in all cases. With violet lights (stop signals in sidings) a 1.8-watt lamp is always used and the minimum horizontal spread for signals fed from a main supply is 12 deg. A deflector unit is fitted to the lamp case hood where a close up indication is specially desired.

Each light unit has stepped doublet clear lenses, 160 mm. (6½ in.) dia., in a water- and dust-proof case painted dead black inside. Coloured glass screens are fitted to produce the light required. The fixing lugs are accurately machined and a sighting device enables the lights to be directed exactly as desired. The change in the

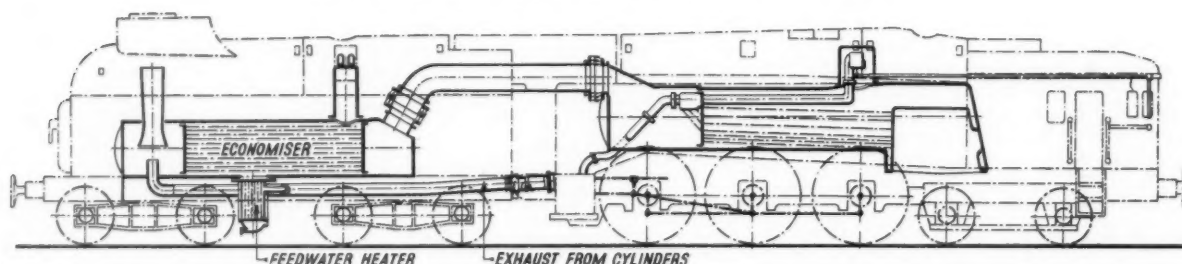
aspects is produced by contact makers attached to the signal discs and arms. A typical example of a set of combined signals is given in the accompanying diagram, where the group consists of a semaphore, outer disc and reduced speed signal. Where both the "on" and "off" indications consist of one light, as in a single semaphore, one lamp unit is provided and the colours are changed by spectacle mechanism. Fixed signs, such as junction approach warnings, speed limit boards, &c., are lighted by a single projector type unit. Some small size disc signals have units turning with the disc and carrying lenses on the different faces.

At stations with mains supply the signals are arranged in groups, each lighted from its own set of accumulators in a cupboard, of sufficient capacity to provide 48 hr. working if the main supply fails. Primary batteries are housed in concrete containers, and to economise power, when practicable, signals fed from them are arranged to be switched off during the day by a signalman.

Results Obtained

Appreciable savings have been effected in maintenance, while, compared with the oil lamps previously used, the visibility of the lights has been considerably improved. The number of cases of signals going out has fallen, as much as 72 per cent. for the outer signals alone. Since the introduction of electric lighting in 1935, the percentage of failures of all kinds has steadily fallen and the change has proved very satisfactory. The long-burning oil system on the less important routes has also given satisfactory results.

A FRANCO LOCOMOTIVE IN ITALY



IN 1937 a Class "670" locomotive of the Italian State Railways was converted to the Franco system and tried against a similar locomotive in its original condition. It may be recalled that in the Franco type of articulated steam locomotive (which was described in THE RAILWAY GAZETTE of December 2, 1932, page 666) the exhaust steam is led to a feed-water heater and the flue gases to a large economiser in the shape of an auxiliary boiler. The "670" class is a 4-6-0 locomotive with the boiler and cylinders reversed and the cab at the leading end. Coal is carried in a bunker and water in a separate cylindrical tank tender, the driver thus being given a clear outlook ahead. In the converted locomotive, the economiser is mounted on the tender between two large side tanks. The exhaust from the cylinders is led to a feed-water heater underneath the economiser and raises the temperature to about 66° C. The firebox gases passing through the tubes in the economiser then raise the temperature of the water to about 147° C. The draught is obtained in the usual manner by the exhaust steam which, after passing through the feedwater heater, escapes through a blastpipe to a chimney from the smokebox of the

economiser as indicated in the diagram reproduced. Trials were made at constant speed with a brake locomotive first at 70 km.p.h. (43.5 m.p.h.) and then at 80 km.p.h. (49.7 m.p.h.) on the Bologna—Ancona line and later with a standard type train on the Bologna—Piacenza line. Final conclusions were drawn from a comparison of 17 of the former and eight of the latter tests, and it was found that the thermal efficiency of the boiler was increased from 71 and 70 per cent. at speeds of 70 and 80 km.p.h. respectively to 81 and 80 per cent.

The savings in fuel per d.b.h.p.hr. were 17.8 and 14.5 per cent. at the respective speeds. With the ordinary train trials, in which power was about half the normal, the saving was greater. During the tests the application of the articulated steam and flue gases and their pipes did not give rise to any trouble, although, of course, the increased maintenance required in normal service of such a locomotive would have to be offset against the improvements in thermal efficiency. The trials, however, demonstrated that no difficulty was experienced in maintaining the steam, despite the greater length of the steam and flue gas passages.

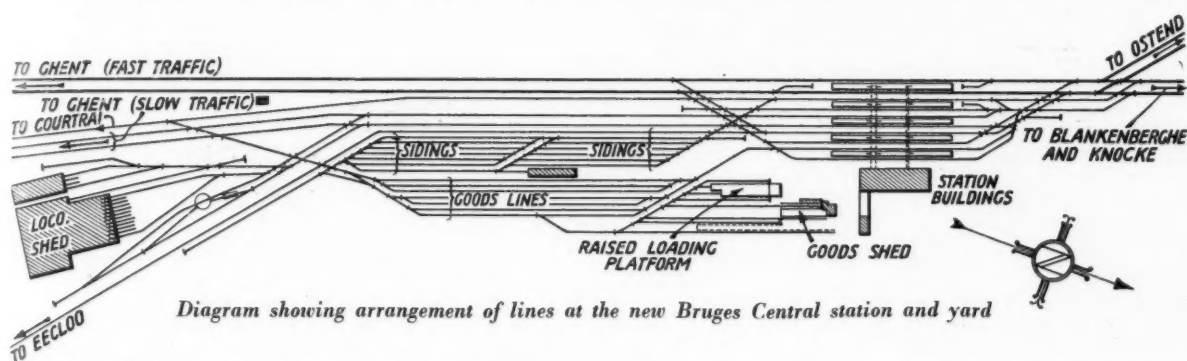
NEW WORKS AT BRUGES AND OSTEND

High-level avoiding lines, passenger and goods stations are being constructed by the Belgian National Railways at Bruges. At Ostend the town station is to be closed and a new connecting line giving access to the enlarged Quay station is under construction

THE existing Belgian National Railways station at Bruges is in many ways inconvenient; there are only four roads through it, it is on a curve, and the platforms are only 16 ft. to 20 ft. in width. Also there is a level crossing immediately at the Ostend end of the station, carrying the important main road to Lille over the railway, and the station buildings are inadequate and obsolete.

The scheme for remodelling was first put forward before

platforms will be 984 ft. long and 26 ft. to 33 ft. wide; access to them is by one passenger and one luggage and parcels subway under the tracks. This arrangement is facilitated by the avoiding line formation level being about 20 ft. higher than that of the old line, and it enables the roads crossing the old line on the level to be carried under the avoiding line by bridges. This high-level work entailed the tipping of some 325,000 cu. yd. of earth excavated from a canal about 12½ miles from Bruges. The



the war, and by 1914 the earthwork and some of the other works were in hand when hostilities interrupted them. It was not until 1934 that reconstruction was resumed, and then two avoiding lines were constructed and a temporary halt built; these are already in use.

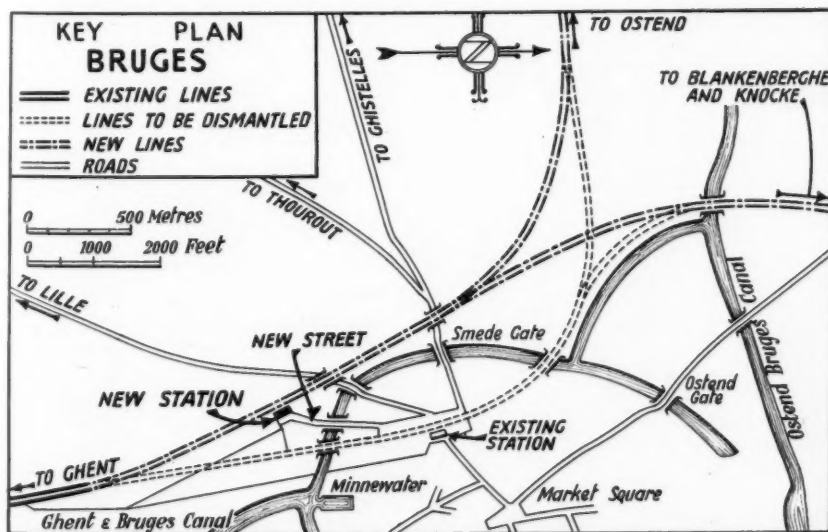
The new station, work on which begun about a year ago, is being built on the avoiding line as shown in the general layout diagram, and will have eight platform roads capable of being worked in either direction; provision is also being made for two additional roads if required later. The new

new signalling is electrical and is controlled from a central cabin. A plan showing the arrangement of the new station buildings is reproduced, the large hall for the accommodation of cycles being conspicuous, also the car park, which is covered. The new goods station is on the Ghent side of the new passenger station, and beyond it again is the new locomotive yard.

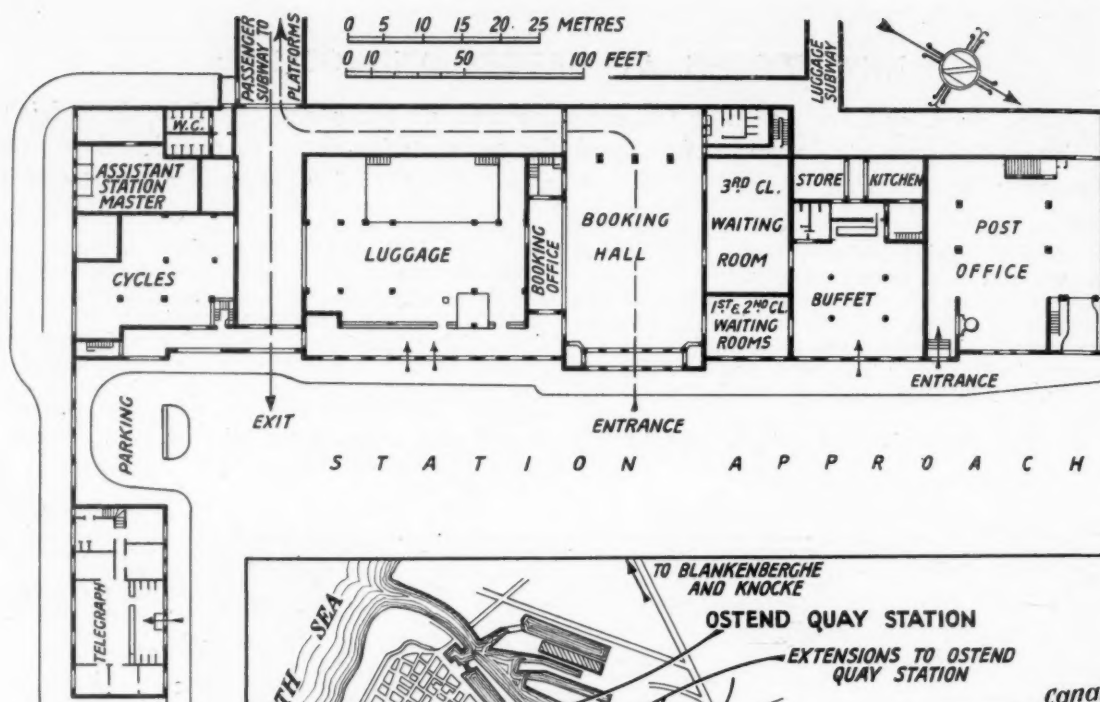
Ostend Scheme

The two existing stations at Ostend and their connecting lines shown in the accompanying diagram are so situated that traffic from Courtrai via Roulers and Thourout—which in summer time includes seaside traffic from Hainaut West (Mons-Tournai) and from Lille, Roubaix, and other centres in northern France—has access only to Ostend Ville station, continuation to the Quay station necessitating double reversing. Also until a few months ago the locomotive repair shops and shed, and local goods station were located at Ostend Ville, with the result that engines of main-line trains—to and from Brussels—had to cross the main line when coming from or proceeding to shed. Ostend Ville station is also situated on valuable land and its existence hampers the normal expansion of the town.

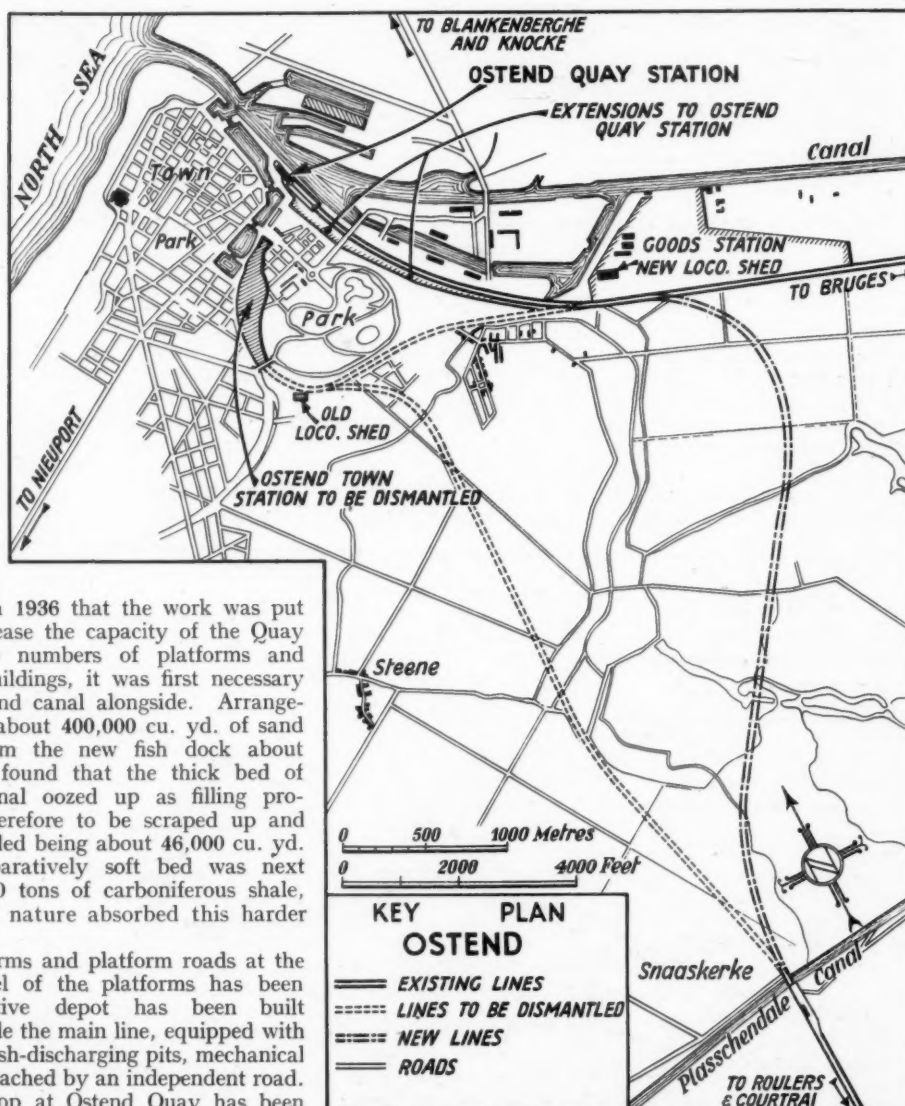
Even before the war a scheme was put forward for concentrating all traffic at Ostend Quay and doing away with the town station



Key plan of railways at Bruges



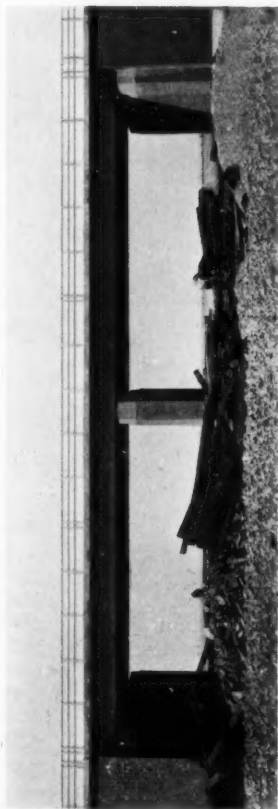
Above : Arrangement of station buildings at the new Bruges Central station



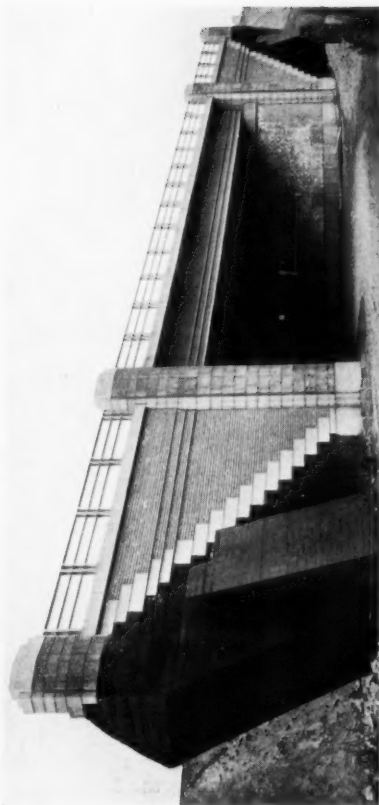
Right : Key plan of railways at Ostend showing new connecting line and lines to be abandoned

entirely, but it was only in 1936 that the work was put in hand. In order to increase the capacity of the Quay station by adding to the numbers of platforms and roads and enlarging the buildings, it was first necessary to fill up a disused dock and canal alongside. Arrangements were made to bring about 400,000 cu. yd. of sand and soil excavated to form the new fish dock about a mile away, but it was found that the thick bed of mud in the dock and canal oozed up as filling proceeded. This mud had therefore to be scraped up and removed, the quantity entailed being about 46,000 cu. yd. The underlying still comparatively soft bed was next covered with about 100,000 tons of carboniferous shale, which, due to its porous nature absorbed this harder mud.

There are now ten platforms and platform roads at the Quay station and the level of the platforms has been raised. A new locomotive depot has been built about 2 km. from it alongside the main line, equipped with modern appliances such as ash-discharging pits, mechanical coal hoppers, &c., and approached by an independent road. The old carriage repair shop at Ostend Quay has been



Concrete beam bridge on the new line giving access to Ostend Quay



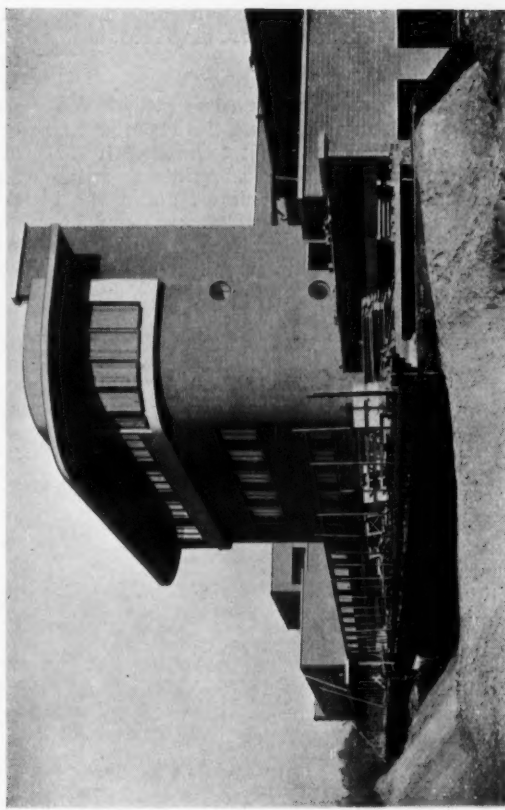
New railway underbridge at Bruges



Typical concrete beam underbridge on new line to Ostend Quay



Facade of the new station buildings at Bruges under construction



New power signal box at Bruges and part of the new station buildings and earthworks for the new embankment

NEW WORKS AT BRUGES AND OSTEND

replaced by the new local goods station, and a new workshop has been built near the new running shed.

New Approach Line

Meanwhile, an entirely new approach line is being constructed so as to give direct access from the Thourout line to Ostend Quay, and will be ready for opening early this year. The new line will leave the existing one at Snaaskerke, the first station towards Thourout, and make a detour 4.5 km. in length to reach the Brussels main line at a point about 2 km. from Ostend Quay. It will run on embankment throughout, crossing four secondary roads by means of steel girder spans encased

in concrete. A dual-roadway bridge measuring 28 m. (92 ft.) between abutments is also being built to cross the projected Brussels—Ostend by-pass trunk road. About a dozen other underbridges are required to span canals and streams. Fill for the embankment was brought from the sand dunes on the site for the extension of the port. It is hoped that the entire scheme will be completed enabling Ostend Ville to be demolished by the summer of this year.

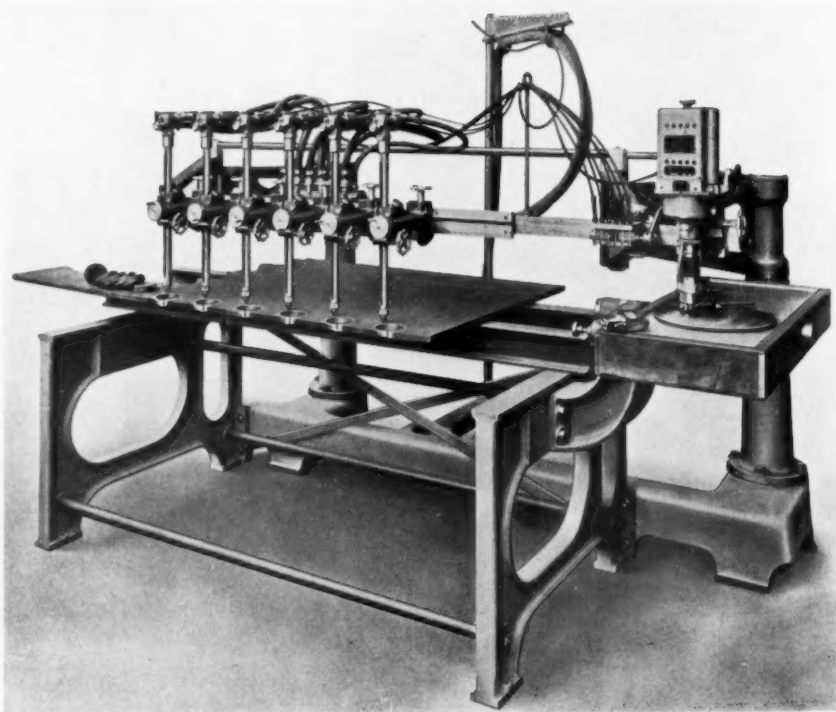
We are indebted to M. Lemaire, Manager of the Permanent Way Department of the Belgian National Railways, for supplying the information on which we have based the foregoing description.

A NEW MULTI-BURNER CUTTING MACHINE

Capable of making six cuts simultaneously

A RECENT addition to the range of machines manufactured by Hancock & Co. (Engineers) Ltd., Croydon, is a multi-burner cutting machine, capable of making six cuts simultaneously; it has been installed in the Shildon works of the L.N.E.R. The demand for increased production is responsible for the introduction of a machine which can cut out simultaneously from steel plate six exactly similar shapes. It has a cutting area for each burner of 30 in. x 10 in. and a built-up framework, the latter consisting of a bedplate with two work supports attached. The bedplate carries two pedestals on which are mounted two pairs of coupled hinged frames. The frames are coupled not only at the front extremities and the centre joints, but also adjacent to the back pivots at the extremities of a second pair of extended arms. By this method of suspension short link frames can be used, and consequently a minimum of ground space is required.

The front coupling bar carries the six cutting burners mounted so that each of them can be independently adjusted, vertically, longitudinally, or transversely. These adjustments are by rack and pinion and lead screw, so that each burner can be quickly and accurately set. The horizontal slides are of "V" formation with ample adjustment for wear. The burners are of the maker's patent remote control type with Bowden operation of heating and cutting oxygen valves. A unit control is provided giving simultaneous operation for all burners. The control has three positions, *i.e.*, "off," "heating," and "cutting." The oxygen is supplied to the burners through a six-way distribution manifold, and each burner hose can be instantly uncoupled from a self-closing coupling. The combustible gas is fed through a six-way tank distributor, and each outlet is provided with a gas cock. The right hand extremity of the front coupling bar



View of cutting machine, showing the six independently adjustable burners on left, and, on right, the electrically-driven universal tracer head

carries the electrically driven universal tracer head with starting, stopping, and reversing switches and oxygen control lever.

With the universal electric tracer the machine can be operated from a drawing or blue print, from a wooden or soft metal template cut to exact size, or automatically from a channel or strip aluminium template. In addition straight lines and circles are cut automatically. The drawing or template table is mounted on a bracket attached to one of the work supports and is arranged to turn over. One side is of aluminium for drawings and the other of wood for template fixing. A swinging tube support is provided to carry the oxygen and gas tubes and electric cables and prevents the possibility of these fouling the framework of the machine.

PAINTING OF ROLLING STOCK BY CONTRACT

The French railways let the painting of their rolling stock to a well-known firm of painters, Omnium Peinture, which has recently installed up-to-date paintshops on the Algerian Railways at Bône

By O. J. MORRIS



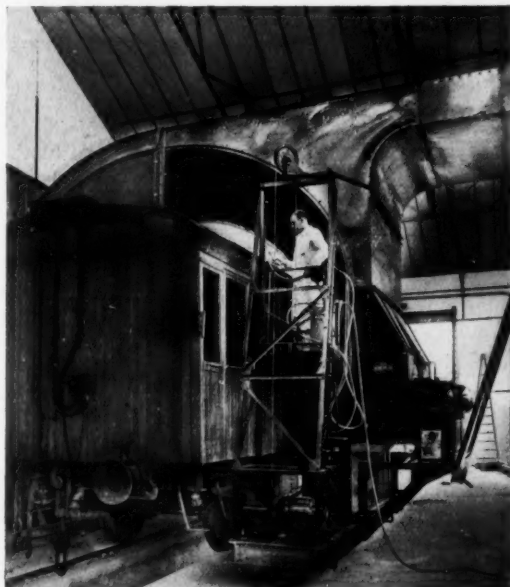
Workshops at Bône, Algeria, of Omnium Peinture, which in addition to its work for the French railways has a painting contract from the Algerian system

It may come as a surprise to many readers that, for some years past, the French railways have entrusted the painting of their rolling stock to an outside contractor. This contractor is Omnium Peinture, of the Rue St. Lazare, Paris, the celebrated French house of industrial paintworkers, whose Managing Director, M. Raymond Guist'hau, has furnished the subjoined notes and illustrations.

The arrangement is, of course, as novel to Britain as it is natural to France; we regard a railway company as more or less a self-sufficient unit, whereas the French executive calls in the independent specialist whenever

possible, or, at least, desirable. Omnium Peinture attained its present status precisely for the last-named reason. Having made a detailed study of paint in its relation to the needs of rolling stock, the company soon won the notice of the former Est and Etat administrations, and was ultimately awarded valuable contracts to staff and maintain their existing paintshops. These contracts were renewed by the Government when it took over, last January, the French main-line railways under the title Société Nationale des Chemins de Fer Française (S.N.C.F.).

The company is also under contract to the Algerian



Operator at work (left) and general view (right) in the "salle de pistoletage" (spray-painting shop) of Omnium Peinture at Bône

Railways, and has recently taken over new paintshops that are the last word in modernity. Situated at Bône, in Algeria, they were built and equipped at the company's expense, under the terms of an agreement whereby, over a fixed term of years, the railway administration pays off the initial debt in the form of instalments compounded in the hour-rate for the work done. The result is that the Algerian Railways effect a current economy, and, at the expiration of the term, become the owners of an up-to-date depot embodying all the refinements of modern paintshop process.

This depot has been laid out with a special view to the requirements of spray-painting—a process, by the way, for which the English language has so far coined no attractive soubriquet, but to which the French has given the expressive term, *pisto-letage*. It is partitioned into three bays, served by an electric traverser, each of which deals with specific operations, so that no time is lost by overlapping. In the first bay, rolling stock is cleaned down, by scraping or burning off; in the second, it is stopped and filled, pumiced and made entirely ready for the third shop, which deals with nothing beyond the actual painting.

We illustrate the interior equipment of this *salle pneumatique*. Its most striking feature is a suction tunnel, technically a *hotte* (built by Kremin, of Paris), mounted on rails and driven at will by an electric motor, the vehicle under treatment remaining, of course, stationary. The *hotte* accommodates two operators, one on each side, who take up their positions on electric lifts, the rise and fall of which, as well as the progress of the apparatus as a whole, is controllable at will.

The principal function of the *hotte* is to draw off the noxious fumes released by the paint as it is delivered, partly vaporised, from the hand-spray. For this purpose, the tunnel is profiled as closely as possible to the contours of the vehicle, and is provided with four exhausters fans, mounted two each side, within a grille, through which they suck up the fumes as they are given off. The fans then deliver the fumes through a vent into a fixed duct communicating with the open air. To avoid blow-back, this duct is closed to the interior of the shop by means of a number of movable valves or shutters, which progressively open as the vent travels across them, and progressively close after it has passed, the valves being operated by the vent itself.

Apart from speed of application and rapidity of drying the latter such that successive coats can be laid on practically without intermission—spray-painting offers the only successful method of dealing with cellulose. Unevenly applied, the coating is apt to detach itself in large areas, as motorists have sometimes found out to their cost. Possibly for this reason, coupled with the difficulties normally attendant upon its application, cellulose has made little headway in railway work, so that a recent instance of its use in this sphere claims interest.

We refer to the ex-Etat streamlined Pacific locomotive No. 231.761, which Omnium Peinture recently painted in cellulose on the occasion of the State visit of King George VI and Queen Elizabeth to the French capital.



Applying the special colour scheme to the ex-Etat streamlined Pacific that hauled the royal train when the King and Queen visited Paris last year

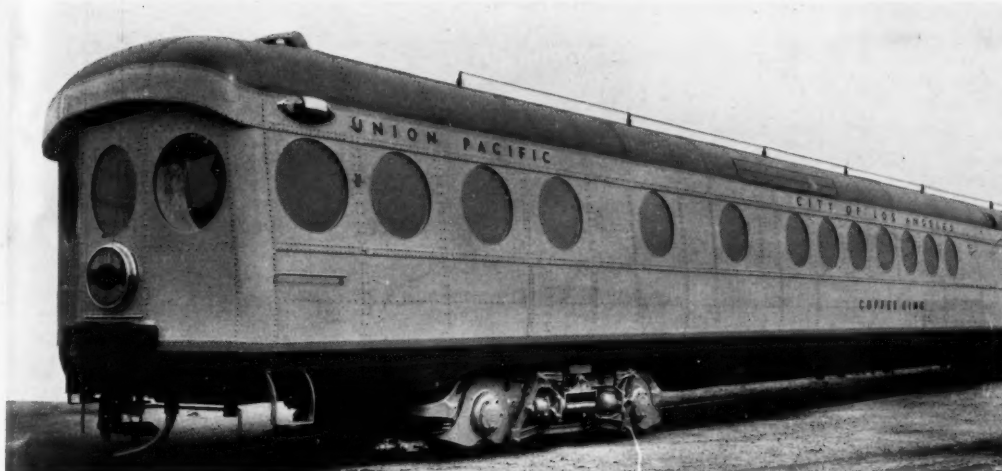
Several filling coats were necessary to prepare the groundwork, over which were sprayed four coats of Nitrolac cellulose. Painted a handsome dark blue, with one gold stripe contiguous with the handrail, the engine was adorned, at the front end, with the entwined colours of France, and carried on each side of the boiler a tricolour plaque. During the royal visit these plaques were covered by similar plaques bearing the Union Jack; all this decorative work was done by the hand-spray, for which purpose consummate skill was needed. The locomotive retains its striking colour scheme, although it has been deprived of its tricolour embellishments, and is now winning admiring glances on its regular turns mainly on the transatlantic boat trains between Paris and the Channel ports.

Railways and the Ideal Home Exhibition

Year by year the promoters of the *Daily Mail* Ideal Home Exhibition interpret their title so generously that there can be few if any aspects of the non-business life of the citizen which are not catered for. This year the exhibition, which is being held at Earls Court, is no exception. As both taking possession and relinquishing a house involve removals, the stand of the British railways is located appropriately on the ground floor near the Warwick Road entrance, in the section devoted to furnishing and decoration. The theme of this tastefully-arranged stand—"It is quicker by rail"—is applied to all branches of railway activity, and the bureau is prepared to supply information on both passenger and goods train traffic, and to answer the general railway inquiries of the public. The German Railways Information Bureau also has a stand, and on this is exhibited a model showing the *Kraft durch Freude* (strength through joy) Baltic seaside resort now nearing completion. This will provide accommodation for 20,000 holiday-makers, and the windows of every room will face the sea. The hotel will be staffed by 5,000 members of the German Women's Labour Service. This resort is to have its own farm, its cinema seating 3,000, and garaging for 1,000 cars.

LIGHT POLARISING GLASS FOR TRAIN WINDOWS

Light-conditioning as well as air-conditioning is the latest refinement of American travel



Left : Air- and light-conditioned car "Copper King" on the City of Los Angeles high-speed train of the Union Pacific Railroad

ACCORDING to the classic theory of the physicists light is a form of wave or vibration in the medium that pervades all space and that for want of a better word is called the ether. The vibration is conceived to be undulations of this medium in every direction. If light is passed through certain crystalline substances the vibrations become unidirectional, just as the vibrations of a stretched string would do were the string made to pass through a narrow slit in a plate. Light that has been so treated is said to be polarised. If an attempt be made to pass this polarised light through a second polarising transmitter much or little of it will pass depending on how the second transmitter is placed. It can be set to confirm the original polarisation, in which case all the light will pass, or it can be set so as to pass only undulations which are at right angles, in which case all the light will be stopped. At intermediate settings the light is repolarised, but the undulations are of smaller energy content after the second polarisation, so that the light intensity is reduced. By turning the second polariser round through 90 degrees it is possible to reduce the light intensity gradually from its maximum to zero.

Up till recently the polarisation of light has been only a laboratory experiment calling for expensive natural crystals, but a substance called Polaroid has now been invented in America, and this is made commercially. It is said to be a flexible sheet having the appearance of slightly darkened celluloid but possessing the ability to polarise 99.8 of the light which it transmits. In an observation car named the *Copper King* which is incorporated in the streamlined City of Los Angeles train of the Union Pacific Railroad there are twenty-nine circular windows each consisting of a fixed and a rotatable Polaroid disc with a protecting outer window of safety glass. By turning the rotatable disc it is possible to reduce the glare of sunlight until comfort is secured. The principle has been quite aptly called light-conditioning. Control of the light through each window is effected by turning a knob. In the interior view we give of the carriage the control knob of the window on the extreme left can be clearly seen. The diameter of the windows is 27 in. Because reflected light is always to a large extent polarised, the stationary disc of Polaroid can be set to protect the passenger from glaring reflections from hori-

zontal surfaces such as those of sheets of water, and this is done in the *Copper King*. The protection from reflected light is given irrespective of the position of the movable disc.

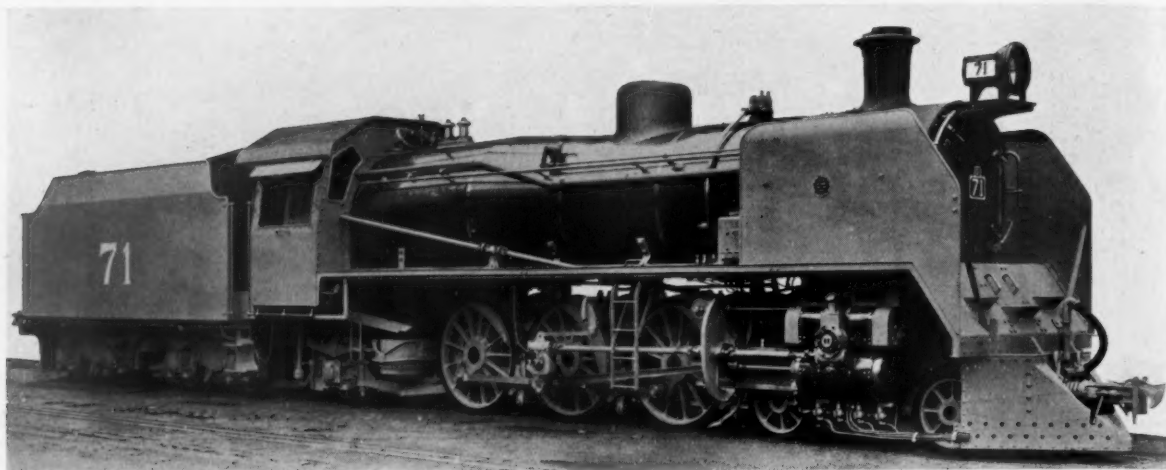
The interior decoration of the *Copper King* is, as the name suggests, effected very largely with copper. Satin finished copper is used for the side wall paneling. The end walls and the ceiling are finished in a pastel copper tint. Other decorative uses are made of copper, and by way of a contrast the carpeting and the seat upholstery are a rich green in colour. The seating accommodation is for 41. A radio is installed and there is a service pantry for providing light refreshments. A shower bath and a barber's shop complete the luxuries of this remarkable carriage. The bathroom is finished in Monel metal.



Interior of "light-conditioned" coach

NEW SERIES 4-6-2 LOCOMOTIVES FOR MALAYA

Detail improvements are incorporated in a further series of locomotives for the Federated Malay States Railways



DURING last year the North British Locomotive Co. Ltd. completed an order for eleven 4-6-2 type locomotives for the Federated Malay States Railways, and these engines were illustrated and described in *THE RAILWAY GAZETTE* of August 12, 1938 (p. 300). Since then six additional locomotives of the same type have been built and a third order for eleven has recently been placed with the same firm.

One of this last series is illustrated herewith. While the design generally is almost identical with that of the previous locomotives, a few modifications have been incorporated in the later engines. The diameter of the three single-expansion cylinders has been increased from the 12½ in. of the earlier engines to 13 in., the stroke (24 in.) remaining as before. The A.L.E. rotary cam

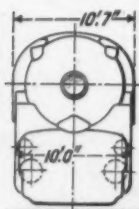
(R.C.) poppet valve gear is retained. Consequent upon the increase in the diameter of the cylinders, the tractive effort, at 85 per cent. of the boiler pressure (250 lb. per sq. in.) has advanced to 23,940 lb. as compared with the 22,130 lb. of the former class. The weight of the engine and tender in working order and the axle loadings remain as before, as does also the adhesion weight, the figures respectively being 100 tons 13 cwt. and 38 tons 5 cwt.

A noticeable feature in the general appearance is the new design of cowcatcher, which now extends across the whole width of the engine, thus providing a greater protection for the cylinders and adjacent parts. The equipment of the locomotives is thoroughly modern, as described in our former article.

PENNSYLVANIA HIGH-SPEED PASSENGER ENGINE

A 6-4-4-6 design with two four-coupled power units, selected to represent American railway achievement at the New York World's Fair

THE Pennsylvania Railroad has now completed at the Juniata shops, Altoona, Pa., a new locomotive of novel design and large proportions intended to handle heavy passenger trains at high sustained speeds up to 100 m.p.h. As will be seen from the accompanying



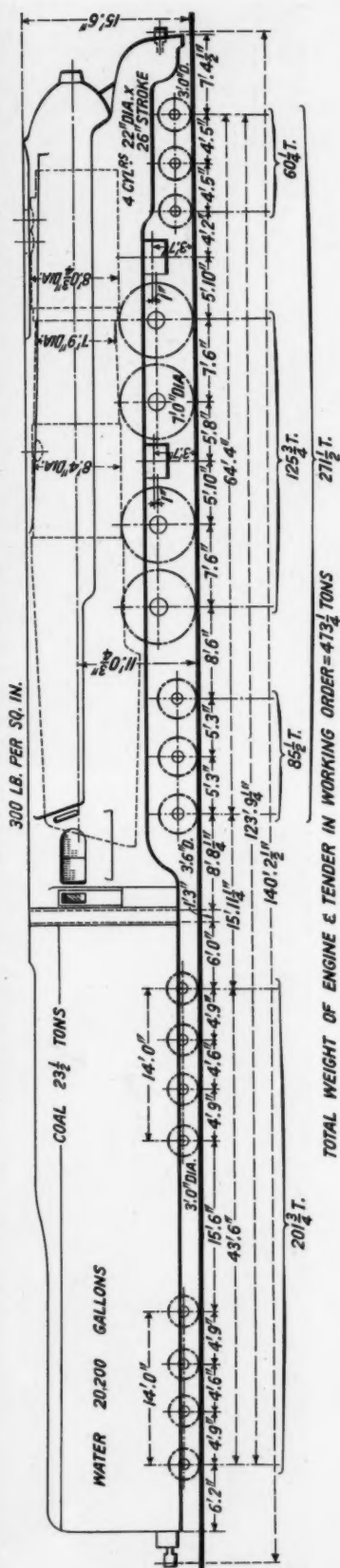
End view of
P.R.R. 6-4-4-6
locomotive

illustrations, this locomotive is of the 6-4-4-6 type, having a leading six-wheeled truck followed by what are in effect two four-coupled engines; a second six-wheeled trailer supports the firebox end. All axles of engine and tender are equipped with Timken roller bearings. Each four-coupled unit comprises two cylinders of 22 in. dia. with a stroke of 26 in., and these, in conjunction with 7-ft. dia. driving wheels and superheated steam at a pressure of 300 lb. per sq. in., furnish a rated tractive effort of 76,400 lb. at 85

per cent. of the boiler pressure. Walschaerts motion and piston valves are used for the steam distribution.

The boiler is of conventional design and provides a total combined heating surface of 7,746 sq. ft. The particulars supplied do not specify the grate area, but the inside dimensions of the firebox are given as 8 ft. by 16 ft. 6 in., so that the grate area will be about 132 sq. ft. There are 219 tubes of 2½-in. dia., and 69 5½-in. flues for the type "A" superheater, made up of 1½-in. elements. Between the tubeplates the length is 21 ft. 10½ in. At the firebox end the barrel has a diameter of 8 ft. 4 in., and at the smokebox end, 7 ft. 9 in. The superheater provides 2,085 sq. ft. of heating surface, equal to 26.9 per cent. of the combined surfaces. The firebox has a total heating surface of 660 sq. ft. or 8.5 per cent. of the total. The overall length of the boiler, including the smokebox is 62 ft. 3½ in.

The engine has a total wheelbase of 64 ft. 4 in., of



New 6-4-4-6 express locomotive, Pennsylvania Railroad, to be exhibited by the American Railroads at the New York World's Fair

which 26 ft. 6 in. is rigid wheelbase. Its weight in working order is 271½ tons, 125½ tons of which are carried on the driving wheels; these weights, with a maximum tractive effort of 76,400 lb., give an adhesive factor of 3.68 and a mean load per axle of 31.4 tons. It must, however, be borne in mind that the weight distribution as given in the table of dimensions is tentative only, and is subject to adjustment when the locomotive is placed in service.

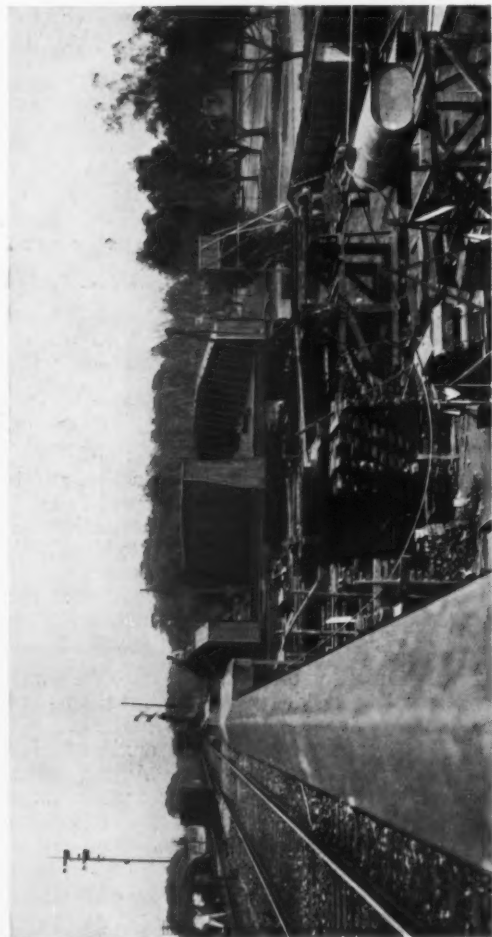
To provide adequate supplies of fuel and water, a tender of very large capacity has been provided, running on sixteen wheels in two eight-wheeled trucks spaced at 29-ft. 6-in. centres, each with a wheelbase of 14 ft. The empty weight is 88 tons, and, when loaded with 23½ tons of coal and 20,200 gallons of water, 201½ tons; this, with the engine weight of 271½ tons, gives a grand total of no less than 473½ tons for the locomotive ready for service. With its high cylinder capacity as shown by the tractive effort, combined with the large boiler, this engine is without much doubt the most powerful express locomotive using steam so far built. Up to the present, however, no data as to its performance on the road or on the testing plant at Altoona are available, as owing to the time between its completion and the date when it was due to be in place at the World's Fair, New York, no opportunity presented itself of making trials. Leading dimensions are set out in the accompanying table.

Cylinders (4), dia.	22 in.
stroke	26 in.
Coupled wheels, dia.	7 ft.
leading truck	3 ft.
trailing truck	3 ft. 6 in.
Evaporative heating surfaces—	
Tubes and flues	5,001 sq. ft.
Firebox	660 "
Total	5,661 "
Superheating surface	2,085 "
Combined total	7,746 "
Boiler working pressure	300 lb. per sq. in.
Tractive effort (at 85 per cent. boiler pressure)	76,400 lb.
Engine weight in working order—	
On all driving wheels	125½ tons.
On leading truck	60½ "
On trailing truck	85½ "
Total	271½ "
Tender weight loaded	201½ "

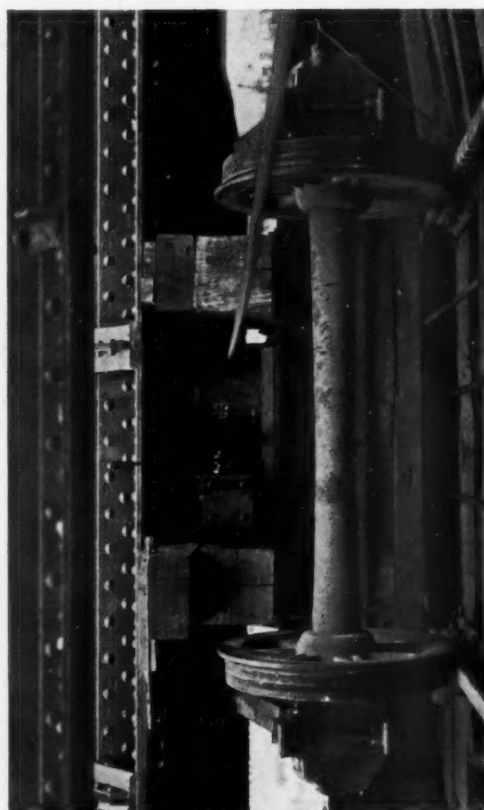
Total weight of engine and tender . . . 473½ "

In appearance the engine is distinctive, and is streamlined on the principles observed in some of the Class "K4s" Pacific locomotives of the Pennsylvania. Thanks are due to Mr. F. W. Hankins, Assistant Vice-President and Chief of Motive Power, Pennsylvania Railroad, for the particulars of this remarkable locomotive.

BRISK DEMAND FOR WELSH COAL.—The South Wales coal trade last week is reported to have been more active than for some years, as a result of orders from foreign countries anxious to lay in stores against an emergency. Among orders received was one from the Egyptian State Railways for 260,000 tons, and additional business is expected from France. Some orders placed with Clyde and Tyne ports have been diverted to South Wales owing to the prospect of earlier shipments.



Two views of the new double-line span fabricated on trolleys ready to be rolled into position. Note the removal of a section of the conductor rail during operation



Details of one of the trolleys, lifting jacks, and packings on track over staging



The new span in its final position, and the brickwork of the old approach viaduct as demolished to allow it to be rolled there; further demolition in progress

DOUBLING THE LENGTH OF A BRIDGE IN ARGENTINA

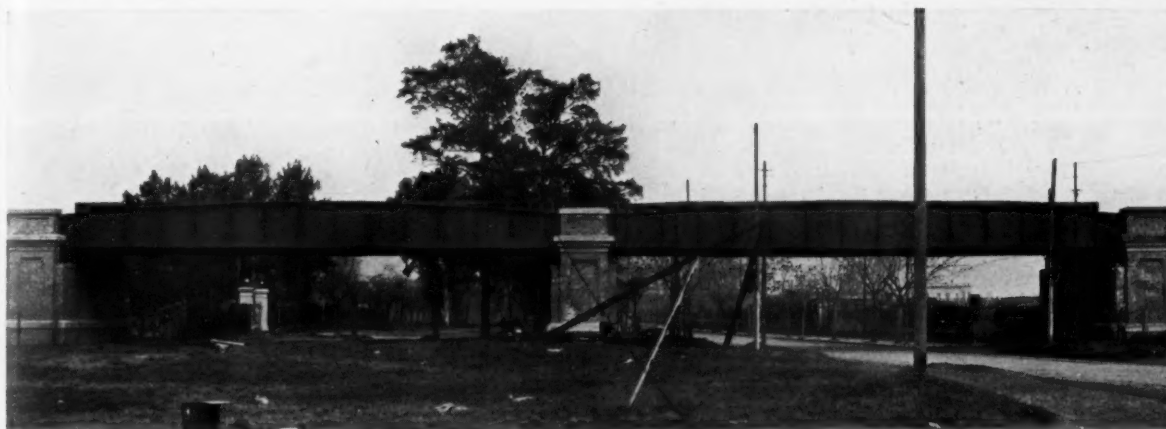
DOUBLING THE LENGTH OF A BRIDGE IN ARGENTINA

The Calle Dorrego bridge, Central Argentine Railway, which carries electric suburban services, has recently had an 82-ft. girder span added to it under traffic

UNTIL recently the electrified double-line local section of the Central Argentine Railway was carried over the Calle Dorrego in Buenos Aires by a single span 25-m. (82-ft.) girder bridge. To permit of the widening of this thoroughfare it was necessary to add a second

stored over the new bridge, demolition of the viaduct was completed, the new masonry completed, and the site finally cleared of all temporary works and materials.

The new double-track plate girder through span, with trough flooring, is built up in Chromador steel, and was



View of the completed bridge

25-m. span under traffic, but before the new span could be placed in position the old brick arched approach viaduct had to be dismantled. Temporary spans were, therefore, introduced to carry the tracks until such time as the upper part of the brickwork could be demolished to allow the new permanent span to be rolled into position transversely. At the same time, all signal and high tension cables had to be removed clear of the work, and, as all electric trains are of the multiple-unit type, it was also possible to remove a sufficient length of the conductor rail to provide a clear zone for the men to work in.

The new span was fabricated complete with flooring on heavy bogie-like trollies running on transverse tracks carried on staging, so that when the new pier and abutment were ready to receive it, and the viaduct had been sufficiently demolished, the new span could be rolled across into its final position. Prior to this operation there had been no interruption of the train service, and the only restriction of speed was dictated by the temporary spans, all off-loading of materials, and other operations involving temporary occupation of the lines, having been carried out at night during slack periods.

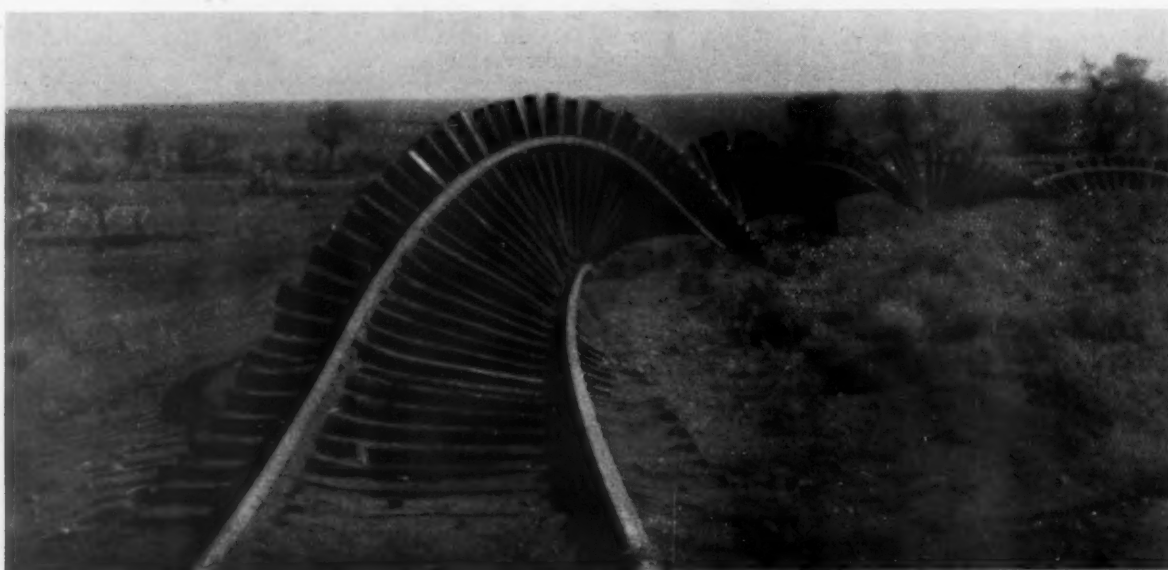
For the lifting of the tracks and temporary spans, in order to roll the new span into position, a carefully-planned programme had to be devised, limiting the occupation of the lines in operation to a minimum. This programme took advantage of the short interval between the passing of the last night train and the first train the next morning, and it was necessary to cancel the running of only three local trains. Suitable arrangements having been made, the new span was rolled into position during the night, the entire operation being successfully completed, and both running lines linked up and bonded by 4 o'clock next morning. Normal traffic working having been re-

fabricated by Alexander Findlay & Co. Ltd., Motherwell, Scotland, to the railway company's design and specification; the total weight of steelwork is, approximately, 220 tons. This is the first railway bridge to be constructed of high-tensile, rust-resisting steel in the Argentine Republic. The manufacture of the steelwork was carried out under the supervision of the company's consulting engineers, Messrs. Livesey and Henderson, London, and the work at the site was executed under the direction of Mr. L. A. Woodbridge, the company's Chief Engineer.

NEW 2-10-0 LOCOMOTIVES, S.N.C.F.—As reported in our issue of April 8 last year, the French National Railways have ordered 50 new four-cylinder compound 2-10-0 mixed-traffic locomotives of the 5.1200 Nord type, which was illustrated and described in *THE RAILWAY GAZETTE* of December 29, 1933 (p. 964). The orders have been placed as follows: 15 from the Ateliers de Construction du Nord de la France, 25 from the Acières du Nord, and 10 from the Société Alsacienne de Constructions Mécaniques. The new engines, which, like their prototypes, have driving wheels 5 ft. 1 in. diameter, will differ from the original Nord locomotives in one or two details. Instead of copper fireboxes the fireboxes will be of welded steel, and will incorporate a Nicholson thermic syphon. The top of the firebox will be slightly inclined so as to permit the use of these engines on more steeply graded lines than those of the Nord. Fifteen of the new engines will be equipped with mechanical stokers, as already fitted to a few of the existing Nord locomotives. Those engines not so fitted will have pneumatically-operated fire doors controlled by pedals.



Two views of the B.B. & C.I.R. exhibit at the Indian Industries Fair in Bombay. It takes the form of a miniature passenger-carrying railway of which the station is modelled upon Bombay Central and houses an enquiry office



The remarkable effect of a cloud-burst in Central Australia. Note the series of spirals and manner in which all sleepers are still fixed to the rails. For description see Overseas columns, page 685, and editorial comment on page 679

RAILWAY NEWS SECTION

PERSONAL

THE MINISTER OF TRANSPORT

The appointment of Captain the Rt. Hon. Euan Wallace, P.C., to be Minister of Transport in place of Dr. Leslie Burgin was announced on April 21. Dr. Burgin will take over new duties as Minister of Supply as soon as the legislation necessary for setting up that ministry has been passed. In the meantime he retains his seat in the Cabinet as Minister without Portfolio.

Sir Robert A. Burrows, a Director of the L.M.S.R., has been appointed a Director of the District Bank Limited.

Major Oscar Loewenthal, whose appointment as General Manager of the Buenos Ayres Great Southern and Buenos Ayres Western Railways was recorded in our April 21 issue, left Buenos Aires on March 30 on a three months' trip to South Africa; he expects to return to Buenos Aires in July.

ROAD-RAIL LIAISON COMMITTEE

The following have been appointed to represent the road interests on the Central Consultative Committee set up under an agreement reached between the four railway companies and the liaison committee representing road interests:—

Mr. A. Andrews, Captain C. Barrington, Mr. J. W. Beresford, Mr. C. S. Dunbar, Mr. Harold Elliott, Mr. G. T. M. Fairclough, Mr. N. D. Fawcner, Mr. I. R. Grove, Mr. C. Holdsworth, Mr. J. S. Nicholl, Mr. R. W. Sewill, and Major W. Taylor.

Mr. W. H. Ashmole has retired from the post of Secretary of the Milford Docks Company, which he has occupied for 11 years, and has been elected a Director. He has been succeeded as Secretary by Mr. A. E. Goskar.

COLONIAL OFFICE APPOINTMENTS

Among the appointments recently approved by the Secretary of State for the Colonies are the following:—

Mr. G. Henderson, Staff Accountant, to be Chief Accountant, Gold Coast Government Railway.

Mr. J. G. Smith, Divisional Transportation Superintendent, to be Operating Superintendent, Ceylon Government Railway.

Mr. H. B. Stoyale, Locomotive Superintendent, to be Chief Mechanical Engineer, Kenya & Uganda Railways.

Captain the Rt. Hon. Euan Wallace, P.C., who has succeeded Dr. Leslie Burgin as Minister of Transport, was born in 1892. He was educated at Harrow and the Royal Military College, Sandhurst, and joined the Life Guards in 1911. Throughout the war he served in France. In 1919 he was posted to our Embassy at Washington as Military Attaché, and in the next year was made A.D.C. to the Governor-

Treasury. Captain Wallace was Unionist Member for the Rugby Division of Warwickshire in 1922-23, and since 1924 has represented Hornsey. In 1934 he was appointed to be one of four commissioners to investigate conditions in the depressed areas of the North-East Coast.

Mr. Edwin William Fraser-Smith, M.A., who, as we briefly recorded on April 14, died at his residence, Low Angerton House, Hartburn, Northumberland, on April 5, aged 59, had held with considerable distinction the secretaryship of the North-East Coast Institution of Engineers and Shipbuilders for 28 years. Mr. Fraser-Smith was a native of Essex, and through his maternal grandmother was descended from the 12th Earl Lovat. He served an engineering apprenticeship in London, and subsequently became assistant to J. Watt Sandeman & Son, civil engineers, Newcastle, and later an Assistant Engineer to the Port of London Authority. Mr. Fraser-Smith was a member of the Institution of Civil Engineers and of the Institution of Naval Architects. His public work in Newcastle included co-opted membership of the City Education Committee and the chairmanship of the Executive Committee of the Northern Counties Technical Examination Council. He held the decoration of Chevalier de la Couronal de Belgique. For more than a decade he was a member of the Australian Squadron of King Edward's Horse. Although concerned chiefly with shipbuilding and marine engineering, Mr. Fraser-Smith took a keen interest in all branches of engineering activity, and we recall, for example, the enthusiastic support he gave to the movement which resulted in placing a commemorative plaque on the birthplace of George Stephenson at Wylam in June, 1929.

Mr. Ivor E. Mercer, A.M.I.Mech.E., M.I.Loco.E., whose appointment as District Locomotive Superintendent, Toton, L.M.S.R., was recorded in our April 14 issue, began his career by qualifying for membership of the Institution of Civil Engineers, and the Institution of Mechanical Engineers. In 1909 he became a pupil of Mr. Dugald Drummond, the C.M.E. of the L.S.W.R., with whom he had experience in the installation of all kinds of machinery in the Eastleigh locomotive works, then under completion. He



Photo]

[Bassano

Captain the Rt. Hon. Euan Wallace, P.C.

Who has succeeded Dr. Leslie Burgin as Minister of Transport

General of Canada. Returning to Great Britain, Captain Wallace was appointed Parliamentary Private Secretary to the First Lord of the Admiralty in 1922, and in 1924 took up a similar appointment to the Secretary of State for Colonies, remaining in that post until 1928. He was Assistant Government Whip in 1928-29, and was a Lord of the Treasury in 1929 and 1931. From 1931-35 he was a Civil Lord of the Admiralty, and in the latter year became Under Secretary of State for Home Affairs, but later in the same year was appointed Secretary to the Department of Overseas Trade. From 1937-38 Captain Wallace was Parliamentary Secretary to the Board of Trade, but last year was appointed Parliamentary Secretary to the

was also attached to the staff which tested the Drummond four-cylinder 4-6-0s. Mr. Mercer received certain training under Mr. D. C. Urie, now Superintendent of Motive Power, L.M.S.R. In 1911 he was transferred as a pupil of Mr. C. J. Bowen Cooke, C.M.E. of the L.N.W.R., and went through Crewe works and had extensive footplate experience. After a period in the drawing office, and carrying out tests on the "George V" class engines, he was sent as Assistant to Crewe South steam shed in 1913, with date of appointment January, 1914. During the war he served in the Royal Navy. After the war he was given charge of Burton (L.N.W.R.) for eighteen months, and in 1924 was made Resident Mechanical Engineer to the Dundalk, Newry & Greenore Railway in Ireland,



Mr. Ivor E. Mercer

Appointed District Locomotive Superintendent, Toton, L.M.S.R.

where he had charge of locomotives, carriages, wagons, harbour and power house machinery. Four years later, under the aegis of the L.M.S.R. Mr. Mercer was given charge at Holyhead of the locomotive depot and harbour machinery. It was during his charge at Holyhead that locomotives first ran through unchanged from Holyhead to Euston, all the locomotives belonging to Holyhead, and being of the "Claughton" class since no heavier engines could then be worked along the Welsh coast. In 1928 came appointment as District Locomotive Superintendent, Bolton, and in 1934 Mr. Mercer took charge of the Wellingborough area, by which time he had held charges in each of the English divisions of the L.M.S.R.

Mr. H. Wheeler, who has been Assistant to the General Manager, Great Western Railway, since 1926, is retiring on April 29. Mr. Wheeler entered the Great Western Railway service in the Rolling Stock Department at Wolver-

hampton in 1892, and was subsequently transferred to the Traffic Department. In 1899 he received an appointment in the General Manager's Office, and in 1912 was placed in charge of the conciliation section and subsequently of



Mr. H. Wheeler

Assistant to General Manager, Great Western Railway, 1926-39



Mr. W. E. Turnbull

Assistant General Manager (Commercial), South African Railways & Harbours, 1938-39

the whole of the staff work, being appointed Secretary of the company's side of the conciliation boards and staff conferences. In 1920, when the Committee of General Managers was appointed to deal with questions affecting rates of pay and conditions of service of railway employees, Mr. Wheeler was appointed Secretary. On completion of this work in 1921 he was appointed Chief Clerk to the General Manager, which position he held until 1926. In addition to his official duties, Mr. Wheeler has been associated with many of the company's

educational and social societies. His particular interest was the debating society, of which he had been a member since its inception in 1903 and Chairman of the committee for the past seventeen years.

Mr. W. E. Turnbull, Assistant General Manager (Commercial) of the South African Railways & Harbours, has retired on reaching the age limit. Mr. Turnbull joined the service of the Natal Government Railways as a clerk in 1900. In 1905 he was appointed as staff clerk at Durban, and in 1910 he was transferred to Johannesburg where he was promoted to the position of Principal Clerk in 1913. In 1917 he was appointed Assistant Superintendent (Operating) and served in this capacity at Kimberley, East London,



Mr. L. Lynes

Appointed Technical Assistant for Carriages & Wagons, C.M.E. Office, Southern Railway

and Durban; he became Superintendent (Commercial) at Durban in 1926. He was transferred to Cape Town as Superintendent (Operating) in 1928, and in 1932 he became System Manager at Kimberley. Two years later he was appointed System Manager at Johannesburg, and in 1931 in the same capacity at Durban. At the end of 1936 Mr. Turnbull returned to Johannesburg as Assistant Chief Traffic Manager; he was appointed Chief Traffic Manager in July, 1937, and Assistant General Manager (Commercial) in September, 1938.

Mr. L. Lynes has recently been appointed Technical Assistant for Carriages and Wagons to the Chief Mechanical Engineer, Southern Railway. He entered the service of the Great Western Railway Company at Swindon works as an engineering apprentice in 1898, and subsequently passed through the physical laboratory to the drawing office, where he was a locomotive draughtsman for four years. He was

then transferred to the Carriage and Wagon Design Section, and prior to leaving the service of the G.W.R. was for two years in charge of that section. In 1914 Mr. Lynes was appointed Chief Carriage and Wagon Draughtsman of the S.E. & C.R., and in 1919 became Chief Locomotive, Carriage and Wagon Draughtsman. In 1923, upon the amalgamation, he was made Chief Carriage and Wagon Draughtsman of the Southern Railway. In this capacity Mr. Lynes was closely associated with Mr. R. E. L. Maunsell, the former Chief Mechanical Engineer, in the design of the Southern Railway rolling stock for its steam services and all the electrification schemes. Mr. Lynes has served on the chief mechanical engineers' Railway Clearing House committees for a number of years, and this year is the Chairman of the Chief Mechanical Engineers' Sub-Committee.

LONDON TRANSPORT OFFICERS

The following have been made principal officers of the London Passenger Transport Board:—

Department of the Chief Mechanical Engineer (Railways): Mechanical Engineer (Maintenance), Mr. E. Graham; Superintendent of Rolling Stock, Mr. E. T. Brook.

Department of the Chief Engineer (Buses and Coaches): Superintendent of Rolling Stock, Mr. W. A. C. Snook.

Department of the Chief Engineer (Trams and Trolleybuses): Rolling Stock Engineer, Mr. G. F. Sinclair.

Department of the General Manager (Operation): Schedules Superintendent, Mr. J. B. Mackinnon.

The foregoing changes were consequent upon the review of the board's organisation reported in our April 7 issue. At the same time various appointments were made, and we publish below biographies of those concerned additional to those appearing in our April 14 issue:—

Mr. G. H. Brooks, who, as recorded in our issue of April 7, has been transferred to the Staff Department, London Passenger Transport Board, as Deputy Chief Staff Officer, entered the service of the London County Council soon after the council began to operate tramways, and worked directly under the then General Manager, the late Mr. Alfred Baker, who subsequently became General Manager at Birmingham. For several years he acted as personal assistant to Mr. A. L. C. Fall, the General Manager until 1924. Mr. Brooks joined the Honourable Artillery Company in the early days of the war and served in France as an officer in the Machine Gun Corps. He was appointed Accountant and Chief Clerk in the Tramways Department of the London County Council in 1936, and four years later became Commercial Manager and deputy to the General Manager, Mr. T. E. Thomas. Mr. Brooks took up a similar position in the Tramways

Department of the London Passenger Transport Board when it was formed in 1933. In 1936 he was appointed General Superintendent (Road Transport) of the board, the position which he recently relinquished.

Mr. J. H. F. Benford, who, as announced in our issue of April 7, has been appointed Assistant to the General Manager (Operation), London Transport, was born in 1890 and was educated at St. Dunstan's College, Catford. He joined the Thames Conservancy Board on leaving school and served during the war from 1914 to 1919, in France (where he was wounded), and in Egypt, Palestine, and Syria. When demobilised he had reached the rank of Major and had received the 1914 Star and the Military Cross. After the war he joined the London General Omnibus Co. Ltd. In 1937 Mr. Benford was appointed an Officer and Secretary to the Traffic Committee of the London Passenger Transport Board, the position he held previous to his new appointment.

Mr. R. P. Biddle, Docks and Marine Manager, Southern Railway, has been appointed by the Lord Chancellor as a Justice of the Peace for the County Borough of Southampton.

Monsieur F. Surleau, Assistant General Manager of the French National Railways (S.N.C.F.) has been appointed by the French Government as Administrator of the City of Marseilles. M. Surleau was associated with M. Raoul Dautry, then General Manager, in the reorganisation of the French State Railways from 1929 to 1935, and in 1934 also collaborated with M. Dautry in preparing and carrying out the Marquet plan of public works in aid of the unemployed. During his career he has reorganised the French railways in Africa and Madagascar, and in 1937 was appointed by the Government to hasten the completion of work on the Paris International Exhibition, and organise the general management. M. Surleau was Chief Engineer, Way and Works of the Etat under M. Dautry, and in 1936 was appointed general manager of the Alsace-Lorraine Railways.

We regret to record the death on March 25 at the age of 87 of Mr. H. C. Walker, whose retirement in 1934 from the chairmanship of Waygood-Otis Limited terminated a connection of nearly 70 years with the lift industry. Mr. Walker was also Chairman of the British General Insurance Co. Ltd., a director of several gas and electricity companies, and of the Portman Building Society until 1938, when he retired from them all, remaining only Chairman of A. E. Walker Limited, and the Rodney Foundry Co. Ltd. At the age of 21 Mr. Walker became a partner in the firm of R. Waygood & Company, engineers, and in 1900 was made its

Chairman and Managing Director. From his first visit to the United States in 1879 arose the friendship between his firm and its American rivals, Otis Brothers, which finally led to their amalgamation under the name of Waygood-Otis Limited. Mr. Walker negotiated the £500,000 order for the installation of his firm's lifts at the Bank station, Central London Railway, on its opening at the end of last century. Under Mr. Walker, the Waygood-Otis firm was responsible for developing the escalator, which has largely superseded the lift for moving large numbers of persons.

The late Commander Sir Edward Nicholl, K.B.E., founder and Managing Director of the Cardiff Hall Line and the Nicholl Steam Ship Company, who died on March 30, left estate of £392,567 (£384,744 net). Sir Edward began his career as an engineering apprentice on the Great Western Railway. When he owned Littleton Park, near Chertsey, Sir Edward laid down on the 150-acre estate a 9½-in. gauge miniature railway, complete with tunnels, level crossing gates, and a signalling system.

PRESENTATION TO MR. F. G. WAINWRIGHT

On April 21 the G.W.R. Superintendents' Conference bade an official "goodbye" to Mr. F. G. Wainwright following his retirement from the position of Divisional Superintendent at Cardiff at the close of 50 years' service with the company, reported in our issue of December 23 last. Mr. F. R. Potter, Superintendent of the Line, on behalf of the conference, presented Mr. Wainwright with a silver fruit dish and a pair of Zeiss binoculars, and in handing over these gifts he said that while his colleagues and the company greatly regretted to lose an officer who had rendered such long and distinguished service to the Great Western Railway, the passage of time made retirement inevitable. Nevertheless, Mr. Wainwright was leaving them in full vigour and all hoped he would enjoy a long and well earned period of leisure. Other speakers included Mr. Trevor Roberts, Divisional Superintendent, Newport; Mr. C. T. Cox, Divisional Superintendent, Paddington; Mr. W. E. Hart, Divisional Superintendent, Birmingham; and Mr. H. J. Peacock, who succeeded Mr. Wainwright as Divisional Superintendent, Cardiff. Mr. Peacock stated that his predecessor had gone out of the way to render him every assistance in his new post and he was deeply appreciative of his help in this respect.

Mr. Wainwright, in returning thanks for the presentation, said he was proud of the fact that four generations of his family were associated with the Great Western Railway, and it had been his main desire to serve the company to the best of his ability at all times.

Ancillary Businesses of the British Railways

I—Docks, Harbours, and Wharves

The business at the railway companies' docks, harbours, and wharves in 1938 suffered severely as a result of the disturbance to trade caused by the unsettled international situation. The total gross receipts of the four companies amounted to £6,661,683, a decrease of £760,320 compared with the previous year, and the net profit of £596,749 was £408,175 less than in 1937. Detailed figures in respect of each company are shown in the accompanying table:—

DOCKS, HARBOURS, AND WHARVES

Company	Receipts		Expenditure		Surplus		Per cent. of surplus to gross receipts	
	1938	1937	1938	1937	1938	1937	1938	1937
G.W.R. ...	£ 1,991,970	£ 2,242,128	£ 1,789,842	£ 1,899,746	£ 202,128	£ 342,382	10·1	15·3
L.N.E.R. ...	2,465,369	2,794,047	2,382,449	2,546,196	82,920	247,851	3·4	8·9
L.M.S.R. ...	985,448	1,102,586	1,010,536	1,067,339	DR. 25,088	35,247	—	3·2
S.R. ...	1,218,896	1,283,242	882,107	903,798	336,789	379,444	27·6	29·4

G.W.R. gross receipts fell by £250,000 as the result of a decline of 3,160,000 tons in the imports and exports at the company's South Wales docks. Shipment coal was mainly responsible for the reduced tonnage, and Viscount Horne, Chairman of the company, stated at the annual meeting that shipments to France were the lowest ever experienced with the exception of the strike year of 1926. Total coal exports amounted to only 19,650,000 tons, approximately one half of the quantity exported in 1913, and 10,475,000 tons less than in 1929, while imports declined by 923,000 tons. Working expenses showed a saving of £60,000, and the amount transferred to renewal or suspense account was approximately £50,000 less than in 1937. There was thus a total saving of £110,000 to offset the reduction in gross receipts, with the result that the net receipts were £140,000 less than in 1937.

There was also a substantial decline in the traffic dealt with at the L.N.E.R. docks. Coal shipments decreased by nearly 4,000,000 tons, whilst imports were 1,750,000 tons less than in 1937, and there was a resultant decrease of £329,000 in gross receipts. Expenditure was reduced by £164,000 notwithstanding an increase of £19,000 in the amount transferred to renewal or suspense account, and the net profit of £82,920 was £165,000 less than in the previous year. These figures include four months' receipts and expenditure in respect of the Tyne Dock, which passed out of the possession of the L.N.E.R. on April 30, 1938, and Sir Ronald Matthews, Chairman of the company, stated at

the annual general meeting that a straight comparison with 1937 showed a reduction of £154,000 in net receipts.

The L.M.S.R., which has a smaller interest in docks than have the other companies, also experienced a disappointing year. Gross receipts fell by £117,000, and as it was possible to reduce expenditure only by £57,000, there was a net loss of £25,000 compared with a profit of £35,000 in 1937.

The Southern Railway Company's

dock undertaking was not so seriously affected as those of the other groups. Nevertheless there was a decrease of £64,500 in gross receipts, which was offset by a reduction of £22,000 in expenditure, resulting in a decrease of £42,500 in net profit. The profit of £336,789 was the highest recorded by any company last year and represented 27·6 per cent. of the gross receipts compared with 29·4 per cent. in 1937.

The total capital invested in railway-owned docks is £70,208,406, the return on which in 1938 amounted to only 0·85 per cent. The best individual result was that of the Southern, which secured a return of 2·4 per cent. on its capital expenditure of £14,031,907.

Dock Developments

Various improvements were effected at the railway companies' docks last year. At the Cardiff docks of the G.W.R. the extensions of the cattle lairage were completed and brought into use, the yards being also extended and additional office accommodation provided. During the year 4,424 head of Canadian cattle were imported at Cardiff, a total exceeded on only two previous occasions. Other important commercial developments included the establishment of a number of important industries at the South Wales docks, or in the immediate neighbourhood, and the inauguration of a monthly direct service of steamers from New Zealand to Cardiff, which resulted in increased imports of frozen meat, butter, cheese, and canned goods. No capital expenditure was incurred on the docks of the G.W.R. in 1938 and the company's capital

account shows a credit of £77,633 under this head.

The L.M.S.R. incurred a capital expenditure of £46,596, chiefly in respect of accommodation at Ayr, Barrow, Fleetwood, and Heysham, and has legislated for a further expenditure of £40,000 this year. In August last the company announced its intention to instal electrical conveyors at Holyhead for the purpose of expediting the transfer of traffic between trains and steamers, and to equip the three boats operating between Holyhead and Dun Laoghaire with distributing conveyors.

The L.N.E.R. introduced improvements at Grimsby, Hull, Lowestoft, and elsewhere, involving a capital expenditure of £60,278, but it was found desirable to modify the plans for extending the fish dock at Hull owing to the depression in the fishing industry. Further improvements to be carried out during the current year will involve an estimated expenditure on capital account of £124,000, of which £101,000 is in respect of works scheduled to the Railways (Agreement) Act, 1935.

The Southern Railway capital expenditure on docks in 1938 amounted to £211,509, all in respect of Southampton, and a further expenditure of £250,000 is envisaged for the current year. A notable feature last year was the progress made on the Southampton Docks Extension estate of 130 acres. Numerous important firms of manufacturers have established depots, factories, or offices on this estate, and the two specimen light factory buildings erected by the railway company have been let. There was an increase of 45 per cent. in warehousing receipts, and consideration is being given to the construction of a new warehouse of modern design on the reclaimed land.

G.W.R. AMBULANCE COMPETITIONS.

—The Great Western Railway ambulance competitions, which have taken place throughout the system in February and March, attracted an entry of 279 teams, 119 in Class 1 (advanced) and 160 in Class 2 (beginners). The semi-final round, held at Bristol, Newport, Birmingham, and Paddington, selected the following eight teams to enter the final ambulance competition at Paddington for the Directors' Shield, Carvell Cup, and prizes: Pontypool Road, Shrewsbury Loco., Swindon, Kington, Barry Loco., Lampeter, Filton Junction, and Banbury. The adjudicators in the semi-final contest were Dr. S. McCormac of Newport and Dr. W. J. Crawford of Southall. In the final competition, which will take place in the General Meeting Room at Paddington to-day, April 28, the adjudicators will be Captain A. C. White Knox, M.C., and Dr. E. J. Selby, O.B.E. It is expected that the presentations of trophies and prizes will be made by Lord Horne, Chairman of the company.

The Italian Rail Speed Revolution

Trains at overall speeds of 60-70 m.p.h. are now in regular operation between the principal towns

Scrutiny of recent Italian time-tables reveals the remarkable extent to which travel in that country has benefited by the recent extensions of the electrified services. It is now possible to travel between Rome and Naples, Florence, Leghorn, Pisa, Bologna, Genoa, Milan, and Turin at average speeds from 60 to over 70 m.p.h., and similarly between Milan and Turin, and Milan and Genoa. Every day there are 24 runs, ranging in length from 50 to nearly 200 miles, scheduled to be covered at start-to-stop speeds of over 60 m.p.h.; and with a number of railcar journeys less than 50 miles in length, the total mileage run in Italy at scheduled speeds of over a mile-a-minute has now reached 3,122 daily. The booked runs in this category exceeding 50 miles long are set out in the annexed table. One of the first-class-only high-speed units displaces the previous fastest Italian run by covering the 136-1 miles from Milan to Bologna in 113 min., at 72.3 m.p.h.; there are three runs at over 70 m.p.h. on this section and two others between Rome and Naples, making five in all, while several heavy regular express trains are scheduled either between Milan and Bologna or Piacenza and Bologna at 60.2 to 63.0 m.p.h. The 69.4 m.p.h. runs between Florence and Bologna are of interest as on this section the high-speed unit concerned passes through the 11½ miles of the Apennine tunnel. The fastest long-distance journey in Italy is made by the same *rapido*, which covers the 523 miles from Naples to Milan in 8 hr. inclusive (65.4 m.p.h.), and returns in 8 hr. 5 min. In the south-bound direction the stops at Bologna, Florence, and Rome consume 23 min., and in the reverse direction 16 min., the net running times being thus 7 hr. 44 min. and 7 hr. 42 min., which give average running speeds of 67.6 and 68.0 m.p.h. respectively. Over so great a distance as 500 miles continuously, these Italian *rapidi* are now the fastest trains in Europe. In 1914 it was impossible to make the journey between Milan and Naples without night travel, and the fastest through time was 17 hr. 5 min., over a route 45 miles longer than the present one.

The energy with which improvement in railway speed has been pursued in Italy is best realised by making a comparison between the facilities available before the great war and those of the present day—a difference of exactly 25 years. Four typical services, three radiating from Rome and all electrically operated, and the fourth across country from Milan to Venice, are included. It will be seen that the quickest Rome—Naples time has been more than halved, and the quickest Milan—Rome time has been practically cut in two; further, the electrically-operated services show an increase of

80-114% in the number of through trains, and a reduction of 32 to 43% in average journey time. It should be added that the *direttissima* (new direct line) between Bologna and Florence, which includes the Apennine tunnel, has reduced the Rome—Milan distance by 22½ miles, and has done away with the extremely difficult gradients of the old Pistoia route, though the exit from the new station at Milan has added 1½ miles; similarly the Rome—Naples *direttissima* has cut the journey from 154½ to 130½ miles and has substituted a high-speed main line for the bad gradients and curvature of the old route. It may be

noted that the best ten daily trains between Rome and Milan average only 7 hr. 55 min. on the journey (49.6 m.p.h. including all stops); and whereas only three trains in all, two northbound and one southbound, in 1914 made possible the Rome—Milan journey without night travel, in 1939 this can be done by any of five services daily each way. Similarly the ten best daily trains on the Rome—Genoa service average 6 hr. 25 min. (48.5 m.p.h. including stops), and the ten best trains on the Rome—Naples service, which chiefly are non-stop between Rome (Termini) and Naples (Mergellina), 2 hr. 13½ min., an average of 58.7 m.p.h. There is probably no other country in Europe in which so revolutionary an improvement of long-distance passenger transport has taken place in so short a time.

THE FASTEST RUNS IN ITALY (OVER 50 MILES IN LENGTH), FEBRUARY, 1939

From	To	Train	Distance	Time	Speed
			miles	min.	m.p.h.
Milan	Bologna	13-45	136-1	113	72.3
Rome	Naples (Mergellina)	20-00	130-5	110	71.2
Naples (Mergellina)	Rome	10-02	130-5	110	71.2
Milan	Bologna	19-40	136-1	115	71.0
Bologna	Milan	16-07	136-1	115	71.0
Bologna	Florence	15-41	60-2	52	69.4
Florence	Bologna	15-12	60-2	52	69.4
Rome	Leghorn	17-02	196-3	181	65.1
Turin (Porta Susa)	Milan	6-31	91-2	91	65.1
Milan	Turin (Porta Susa)	21-08	91-2	92	65.1
Leghorn	Rome	10-52	196-3	183	64.4
Milan	Genoa	18-55	93-1	90	62.1
Bologna	Piacenza	19-43	91-3	87	63.0
Florence	Rome	16-38	196-3	187	63.0
Rome	Florence	12-00	196-3	187	63.0
Genoa	Milan	7-33	93-1	92	60.7
Verona	Padua	9-54	51-6	49	63.2
Verona	Padua	19-54	51-6	49	63.2
Milan	Bologna	15-15	136-1	133	61.4
Venice	Cervignano	21-33	69-5	69	60.5
Piacenza	Bologna	8-37	91-3	91	60.2
Turin	Genoa	7-00	103-1	103	60.1
Rome	Naples (Mergellina)	16-45	130-5	131	59.8
Rome	Naples (Mergellina)	19-20	130-5	131	59.8

ITALIAN TRAIN SERVICES, 1914 AND 1939

Service	Distance		Fastest Time		No. of Daily Services		Average Journey Time		Increase of Service	Reduction in Av. Time
	1914	1939	1914	1939	1914	1939	1914	1939		
	Miles	Miles	hr. min.	hr. min.			hr. min.	hr. min.	per cent.	per cent.
Rome-Milan	413½	392½	11 50	6 00	10	18	13 21	8 40	80	35
Rome-Genoa	311½	311½	9 30	5 10	10	18	10 43	7 10	80	32
Milan-Venice	164½	164½	4 15	2 55	14	20	4 57	3 58	43	20
Rome-Naples	154½	130½	4 00	1 59	14	30	4 36	2 38	114	43

"PUTTING A RAILWAY OVER THE ROCKIES."—On April 5 at Bishopgate Institute, E.C.2, Mr. Claude A. Jones, representing the Canadian Pacific Railway, gave a lantern lecture and showed a film on the origin of the C.P.R. and its development into the "World's Greatest Travel System." He explained to his audience that the railway had been constructed as a political necessity—an east-to-west link was vital if British Columbia were not to come under the sway of the U.S.A. Government, and indeed, that state agreed to come into the discussions for a united Canada only on condition that

such a link were made. It required the indomitable courage of men like Lord Mount Stephen and Sir William Van Horne—men as brave as the pioneers who crossed the formidable Rockies and Selkirks—to enable the difficulties, financial and constructional, which beset the C.P.R. at the outset, to be overcome. The step of transforming the line from a Government concern to a private company was a bold one, but one dictated by politics and economics. By the courtesy of the maker, scenes from the film, "The Great Barrier," were included in Mr. Jones's film, and were much appreciated.

London Passenger Fares

Railway Rates Tribunal Inquiry

The Railway Rates Tribunal, sitting at the Incorporated Accountants' Hall near the Temple Station, resumed on April 18 consideration of the application of the four main-line companies and the London Passenger Transport Board for sanction to a 5 per cent. increase in certain fares within the London Passenger Transport Area. Objections to the application are being raised by the County Councils of London, Middlesex, and Hertfordshire, by 40 other local authorities, and 21 other bodies. The main-line companies are seeking power to increase their standard fares by 5 per cent. and London Transport is applying in respect of lines jointly owned by it and the main-line companies.

Evidence by Mr. Frank Pick

Mr. Frank Pick, Vice-Chairman of London Transport, was recalled on April 18 for cross-examination by Mr. Abady, K.C., who appeared for several Councils in Surrey. He said that since 1937 the whole aspect of London was changing, and the rates of increase of traffic on which the board relied when it embarked on new programmes were now clearly not going to be realised at anything like the rate they had expected. It was necessary that they should secure additional revenue to meet immediate and future requirements. It was still the policy of the board to keep fares as low a level as possible and to increase facilities, but it had now to be considered whether the economic basis on which this traffic was being encouraged. The board had come to the conclusion that without departing from the penny a mile basis, it meant a more strict application than had been the case. He could not agree that the board would get an increase in revenue when the capital expenditure on trolleybuses and railway extensions had fully fructified, without the necessity for an increase in the charges of the main-line railways. The main-line companies could obtain an increase in revenue of £215,000 without any sanction by the tribunal by raising up to the standard the suburban fares at present below standard. If sanction were withheld the total amount of increases that would in fact be made would be £1,179,000, less £215,000 of the main-line railways and £5,000 of the board, so that the total increase which would flow into the pool would be £959,000. On that basis the board would get approximately £594,000.

Answering Mr. Moelwyn-Hughes for the London County Council, Mr. Pick said that the reason for maintaining the difference between the main-line 1½d. a mile and the board's 1d. a mile was a difference in the nature of the traffic. The main-line suburban traffic depended more upon cheaper return tickets at the off-peak hours, season tickets, and workmen's tickets, than

upon single fares. They did not provide for the same character of traffic or for the same character of service as the board did, simply because they physically could not. Some of the board's longer-distance single fares were being increased by a complete penny so as to bring them more nearly to the main-line fare of 1½d. a mile increased by 5 per cent. It was rent plus travel which people would have to take into consideration when determining where to live. In reply to a remark by counsel that "you can wear a second-hand suit of clothes, but you cannot use a second-hand ticket," Mr. Pick said "you should not do it, but I am sorry to say that some people find they can." Increased fares would produce an increased revenue today. The fares which the board was altering were below the reasonable level. Its fares throughout London were by no means equal in their incidence upon the traffic; in certain directions they were too low and would be increased; in other sections where they were too high they would be reduced. Once money had passed out of the free control of the board into a fund set aside for the purpose of renewals, it must be applied for the purpose of renewals. The largest increase in workmen's fares would be 2d. return, and that was in order to straighten out some rather long-distance cut fares which had been left surviving. All these figures, when increased, would still be below the board's basic workmen's fare of ½d. a mile.

Replying on April 20 to Mr. S. E. Pocock, who appeared for certain Surrey ratepayers and Essex local authorities, Mr. Pick said it was assumed that the board would obtain £664,000 additional revenue from the pool if the application were granted. There was a risk in trying to extract more money from the public, but it was a risk which the board had got to take. In the form proposed by the board the risk was not very great. A remedy for overcrowding at Romford would be provided in 1940 by the electrification of the L.N.E.R. to Shenfield and the extension of the Underground. If in the meantime an increase in fares were postponed, the board would not be able to pay for the improvements. In answer to Mr. Stanley Prescott, for the Herts County Council, Mr. Pick said that the board had never had an adequate revenue. It had waited five years to see whether it could devise other means than by increasing fares to secure that adequate revenue.

In reply to Mr. Lewes, who asked whether an alteration in the capital of the board might be the more proper method of dealing with the board's difficulties than the raising of the fares, Mr. Pick said there was no

present approach to the solution of the problem upon those lines.

Answering, on April 21, questions by Mr. Jack Gaster, as to the position of the pool if the board's application were rejected and that of the main-line companies approved, Mr. Pick said that if the present scheme were not allowed to be carried out as a consistent whole it would be a serious embarrassment and a new scheme would have to be found.

Sir William Wood's Figures

Sir William V. Wood, Vice-President, L.M.S.R., was recalled on April 21, and put in two further tables, one of them dealing with the London area by reason of material which was available for September, 1934, in relation to the Southern Railway, and the other in relation to estimated increase of costs. In September, 1934, all the railways were required to make a periodical return to the Minister of Transport of the receipts per passenger mile. The Southern Railway took out the London portion separately in making that return.

Sir William Wood showed that the average receipts per passenger-mile in September, 1934, on the Southern Railway were in the London area 0.628d., and on the rest of the undertaking 0.793d.; the average receipts per loaded coaching train-mile in 1934 were 56.602d. in the London area, and 62.310d. for the rest of the undertaking. The table dealing with costs showed that the average expenditure on maintenance of way and works per track mile in 1938 was on the L.M.S.R. £685 in the London area and £448 on the rest of the undertaking. On the Southern Railway it was £1,017 in the London area, and £707 outside. It also showed that the estimated annual cost of additional rates of wages and salaries payable in the London area alone for the four main-line railways in 1938 was £560,000. In answer to Mr. Abady, K.C., Sir William Wood agreed that the average receipts of the Southern Railway undertaking outside the London area would be increased by the higher scale operative on some of the boat expresses.

Mr. Abady, K.C., then addressed the tribunal on behalf of certain local authorities. He said that of the total product of £215,000 there was no evidence to show what proportion would go to each of the railway companies separately. He submitted that a factor for the tribunal to consider was that passengers on the Southern Railway were, owing to overcrowding, not getting the accommodation for which they were paying. On April 24 he asked the tribunal not to authorise the increases but to leave it to the joint committee to arrange an alteration of the pool. Mr. Moelwyn-Hughes on April 25 opened the case for the London County Council, stressing particularly the overcrowding, and the high percentage of bread and butter traffic in London.

QUESTIONS IN PARLIAMENT

Overcrowding in City Trains

Mr. James Hall (Stepney, Whitechapel—Lab.), on April 19, asked the Minister of Transport, whether he was aware of the excessive overcrowding of trains running between Whitechapel and the City during the early afternoon; and what steps he was taking to obtain better service for those travelling in these trains.

Dr. Leslie Burgin (Minister of Transport): I am informed by the London Passenger Transport Board that there are occasions when passengers have to stand in these trains immediately after the lunch period, but that this condition of affairs applies only for three or four stations and is accentuated by the tendency of passengers to crowd into a few cars instead of spreading themselves over the whole length of the trains. For the rest of their journey these trains have ample accommodation, and in the opinion of the board any inadequacy that does exist over a short part of the journey is not such as to justify an increase in the train service as a whole.

Mr. Hall: Is the right honourable gentleman aware that these trains consist of only three carriages, and that I have stood at Liverpool Street station and seen people left on the platform because it was not possible to squeeze in the train anywhere? If the train was a little longer than three carriages I think it might be possible to obviate the difficulty. Will the right honourable gentleman take steps to bring that about?

Dr. Burgin: I am sure the House understands that this is a matter for the London Passenger Transport Board and not for me. Under Section 30 of the Act of 1933, any local authority can make an application to the Railway Rates Tribunal for new or improved services or facilities. That option is open to any local authority interested. It is not a matter over which I have any control at all.

Mr. Hall: Am I to understand then that the right honourable gentleman is unable to make any representations to the London Passenger Transport Board on the lines I have indicated?

Dr. Burgin: No, the hon. member must not so understand. The information I have furnished to the House is information given to me by the London Passenger Transport Board. I am pointing out to the House the nature of the remedy which is open to any local authority should the facilities not be considered sufficient.

Rail and Road Goods Traffic

Mr. T. Kennedy (Kirkcaldy—Lab.), on April 20, asked the Minister of Transport, if he had now received the report of the Transport Advisory Council on the matter of the proposed agreement between the railway com-

panies and the shipping and road transport interests.

Dr. Leslie Burgin (Minister of Transport): Yes, sir.

Square Deal Proposals

Mr. David Adams (Durham, Consett—Lab.), on April 26, asked the Minister of Transport, what progress had been made in the application of the railway companies for improved conditions for their services; and what measures he was taking in this connection to ensure that the interests of other forms of transport and also those of industrial rail users and of the travelling public, were being safeguarded.

Mr. Ben Smith (Bermondsey, Rotherhithe—Lab.) asked the Minister of Transport, whether he had yet received the report of the Transport Advisory Council on the railway companies' square deal proposals; and when did he propose to publish it.

Mr. T. Kennedy (Kirkcaldy—Lab.) asked the Minister of Transport if, having received the report of the Transport Advisory Council on the matter of the proposed agreement between the railway companies and the shipping and road transport interests, any legislative or other action was to be taken to give effect to the report.

Captain Euan Wallace (Minister of Transport): I have received the report of the Transport Advisory Council and propose to publish it as soon as possible. I am giving immediate and careful consideration to the report but I am not yet in a position to make any statement.

Mr. Kennedy: In view of the possible early amalgamation of these interests, may I ask for an assurance that public interests will be protected in the matter of railway and other services and rates?

Captain Euan Wallace: I do not think I can say more than that I will give immediate and careful attention to the whole report.

Mr. B. Smith: May I ask the Minister whether he will have the report published with the utmost celerity having regard to the many interests which are concerned in it, and the fact that it has now been available for quite a long time?

Captain Euan Wallace: There will be no avoidable delay in the publication, but the honourable member must recognise that at the present time the Stationery Office is very hard pressed.

Mr. D. Adams: Are we to understand that the House will have an opportunity of ratifying any decision to which the Minister may come?

There was no reply.

Mr. C. C. Poole (Lichfield—Lab.) asked the Minister of Transport if he was yet in a position to make a statement on the railway companies' square deal application.

Captain Euan Wallace: I am not yet in a position to make a statement on this subject.

Southern Railway Accommodation Crossing

Mrs. Adamson (Dartford—Lab.), on April 26, asked the Minister of Transport whether he had now received replies to his recent communications with the Southern Railway Company and the local authority regarding the private roadway across the railway between Abbey Wood and Belvedere stations, which was known as Boarers Manoway; and what steps were likely to be taken to overcome the danger of accidents at this accommodation crossing in the future.

Captain Euan Wallace: As my predecessor promised in the reply which he gave the hon. member on February 9, the question of this accommodation crossing is being investigated but it is not proving easy to find an acceptable solution. The hon. member will be aware that I have no power in regard to this private road but I can assure her that I shall nevertheless continue to do my best to reach a satisfactory arrangement. I will keep the hon. member informed of developments.

Parliamentary Notes

L.M.S.R. Bill

The London Midland & Scottish Railway Bill was read the third time and passed in the House of Commons on April 24. It was read a first time in the House of Lords on April 25.

Southern Railway Bill

The Southern Railway Bill, which had been put down for consideration by a Select Committee (Group C) of the House of Commons, was on April 24 removed from that group and referred to the Committee on Unopposed Bills.

Staff and Labour Matters

Engineering Wages

Provisional arrangements have been made for a conference between the engineering unions and the National Employers' Federation to be held in London on May 10 to discuss an application for increased wages and improved conditions of service.

40-hour Week Iron and Steel Industry

At a meeting of the Iron & Steel Trade Employers' Association and the Iron & Steel Trades Confederation in London on Thursday, April 20, the setting up of a committee to investigate the possibility of introducing a 40-hour week in the iron and steel industry was agreed to in principle by employers and employees. It is understood that the committee will consist of ten representatives of the employers and ten representatives of the men.

RAILWAY AND OTHER REPORTS

Madras & Southern Mahratta Railway Co. Ltd.—The directors have declared an interim dividend for the half-year ending June 30, 1939, payable July 1, of 2½ per cent., namely:—Guaranteed interest 1½ per cent., and stockholders' revenue account 1 per cent. An interim dividend of 4½ per cent. was paid on July 1, 1938.

Trans-Canada Air Lines Limited.—Operating revenues in 1938 were \$590,808, and operating expenses \$1,303,780, including amounts spent on the development of new services and training of personnel. The company is operating nine Lockheed Super-Electras and five Lockheed Electras. A total of \$2,779,314 has been invested in aircraft and ground equipment.

Potteries Motor Traction Co. Ltd.—This company, a subsidiary of the British Electric Traction Co. Ltd., earned in 1938 a net profit of £83,084, against £84,273 for 1937. Adding £24,880 brought forward makes a total available of £107,964. The directors have again transferred £30,000 to reserve and recommend a final dividend of 6 per cent., making 10 per cent. for the year, the same as for 1937, and leaving £23,839 to be carried forward.

City of Oxford Motor Services Limited.—The accounts of this company, which is associated with the Great Western Railway Company and the British Electric Traction Co. Ltd., show that the profit for the year 1938 amounted to £28,376, in comparison with £30,452 for 1937. Adding £6,361 brought forward makes a total of £34,737, of which £5,000 (against £10,871) is transferred to reserve, £4,810 is applied to preference dividend, and £18,080 to a dividend of 8 per cent. free of tax, on the 226,000 ordinary shares of £1 each, leaving £6,847 to be carried forward. For the year 1937 a tax-free dividend of 10 per cent. was paid on 141,750 ordinary shares.

Northern General Transport Co. Ltd.—Total revenues for the year 1938 amounted to £808,394 (against £748,243 for 1937) and the total expenses, including £54,000 provision for renewals and £20,000 provision for income tax, were £626,816 (against £580,810), leaving a working surplus of £181,578, against £167,433. Adding £52,070 brought forward gives a total of £233,648. From this amount the sum of £78,514 is transferred to reserve, and from the balance of £155,134 the directors again recommend the appropriation of £3,000 to employees' assistance fund and of £19,500 for dividend for the year on the 6½ per cent. preference shares. The dividend recommended for the year on the ordinary shares is again 10 per cent., but it takes £83,108, against £69,257, leaving £49,526 to be carried forward. The authorised capital has been increased to £1,132,000 by the creation of 132,000 additional

ordinary shares of £1 each. During the year £138,514 of the amount standing to reserve was capitalised and distributed to the ordinary shareholders in fully-paid ordinary shares. The company is controlled jointly by the L.N.E.R. and the British Electric Traction Co. Ltd.

Sharpness Docks.—The report for 1938 of the Sharpness Docks & Gloucester & Birmingham Navigation Company shows that receipts amounted to £98,712 and expenditure to £55,717, leaving a balance of £42,995, compared with £49,687 for 1937. A dividend of 1 per cent. (less tax) on the ordinary consolidated stock is payable on April 30. This compares with 2 per cent., less tax, paid for 1937. The total quantity of goods imported amounted to 700,432 tons, as compared with 713,200 tons in the preceding year, and the exports to 45,747 tons, against 35,863 tons. The number of directors has been reduced from 15 to 12.

Keighley-West Yorkshire Services Limited.—Profit for the year ended September 30, 1938, was £53,467, against £40,697 for the previous year. From the profit of £53,467 are deducted £12,769 for fuel taxation and vehicle licences, £8,620 for income tax, £880 for interest on loans, and £6,966 for depreciation, leaving a balance of £24,232, of which £12,116 goes to the Keighley Corporation and £12,116 to the West Yorkshire Road Car Co. Ltd. As from October 2, 1932, the Keighley section of the West Yorkshire Company and the transport undertaking of the Keighley Corporation have been operated by Keighley-West Yorkshire Services Limited, the net profits of which are shared equally by the West Yorkshire Company and the Corporation.

Birmingham & Midland Motor Omnibus Co. Ltd.—For the year 1938 this company, which is jointly controlled by the L.M.S. and G.W. Railway Companies and by the British Electric Traction Co. Ltd., secured net traffic and other receipts of £650,267, together with interest and dividends of £13,228. The balance of the profit and loss account for the year amounted to £246,345 (against £259,486). After deducting £43,692 placed to reserve and adding £79,445 brought forward, there is a sum available of £282,098 (against £267,445), out of which it is proposed to apply £8,000 to dividend of 8 per cent. for the year on the cumulative preference shares, £120,000 to dividend of 10 per cent. for the year on 1,200,000 ordinary shares, £12,000 to dividend of 5 per cent. for the year on 240,000 new ordinary shares, £60,000 to bonus of 5 per cent. on 1,200,000 ordinary shares, and £6,000 to bonus of 2½ per cent. on 240,000 new ordinary shares, leaving £76,098 to be carried forward. The nominal capital has been increased from £1,325,000 to £1,565,000

by the creation of 240,000 new ordinary shares of £1 each paid up by capitalising £240,000 of the amount standing to reserve. These shares were distributed among the holders of the 1,200,000 ordinary shares in the form of a bonus, and in respect of the year ended December 31, 1938, rank for dividend at a rate equal to one half of the total dividend declared in respect of such year on the 1,200,000 shares. In all other respects the new shares rank *pari passu* with the 1,200,000 shares. A garage with a capacity for 70 buses has been constructed at Cradley Heath.

Rhondda Transport Co. Ltd.—Net profit for the year 1938 amounted to £35,451, compared with £35,871 for 1937. It is proposed to place £22,000 to reserve, and again to pay a dividend of 10 per cent., leaving £5,939 to be carried forward, as against £13,388 brought in.

South Wales Transport Co. Ltd.—This company, a subsidiary of the British Electric Traction Co. Ltd., has declared a dividend of 4 per cent. on the ordinary shares for 1938, the first payment on these shares since the 5 per cent. for 1927. Arrears of dividend on the preference shares were paid off in April, 1938.

Albion Motors Limited.—The directors recommend the payment of a dividend of 15 per cent. on the ordinary shares for the year 1938, comparing with 12½ per cent. for 1937. The net profit, after providing for depreciation and all charges, including loss on subsidiary company, amounted to £200,104, and the net trading profit to £198,689, an increase of £14,140. Allocations are made of £41,000 in respect of income tax and N.D.C., and of £55,000 to reserve fund. The preference dividend absorbs £8,031 and the ordinary dividend £74,610, leaving £76,166 to be carried forward against £56,118 brought in.

Churchill Machine Tool Co. Ltd.—After crediting £35,436 reserves no longer required, and making provision for fees, income tax, N.D.C., and reserves the net profit for the year 1938 amounted to £118,722, compared with £72,123 for 1937. The final dividend recommended is 20 per cent., making 40 per cent. for the year 1938, the same as for the previous year. Provision is made for a bonus issue of £65,940 in ordinary shares, leaving £3,902 to be carried forward. It is proposed to capitalise £65,940, part of the undivided profits, the 65,940 ordinary shares to be converted into stock. The capital is to be increased from £400,000 to £500,000 by the creation of 100,000 new ordinary shares of £1 each.

Vulcan Foundry Limited.—The net profit for the eighteen months ended December 31, 1938, amounted to £66,939. After deducting £5,000 for dividends on the 5 per cent. cumulative preference shares paid on March 31 and September 29, 1938, in respect of the year to June 30, 1938, and adding £9,255

RAILWAY AND OTHER MEETINGS

San Paulo (Brazilian) Railway Co. Ltd.

brought forward as at June 30, 1937, there is a credit balance on profit and loss account of £71,194. The directors recommend the payment of 2½ per cent. actual on the 5 per cent. cumulative preference shares in respect of the half-year ended December 31, 1938, and a dividend of 5 per cent. actual on the ordinary shares for the eighteen months ended December 31, 1938, both less tax, absorbing £44,755, and leaving £26,439 to be carried forward.

Pullman Inc. Capital.—The stockholders of Pullman Inc., according to Reuters, have approved a reduction in capital from \$193,700,000 (£38,600,000) to \$154,900,000 (£30,980,000), by reducing the value of each share from \$50 to \$40.

Stewarts and Lloyds Limited.—Dividends are announced on the deferred stock of 12½ per cent. for the year 1938 and at the relative rate on the liaison deferred shares, the same as for 1937. The deferred dividend is payable on a larger capital, as £203,278 of stock was issued in July last. The directors have also decided to set aside £500,000 to a reserve for the maintenance and development of the company's export trade. This is after making the usual annual provision for depreciation at a higher rate than formerly. It is also proposed to allocate £50,000 to employees' benefit reserve and £75,000 as an addition to stock reserve.

Alsace-Lorraine Signal Aspects

Signalling in Alsace-Lorraine is based largely on Central European practice, as are the operating methods, and right-hand running is therefore standard. After a number of proposals had been considered, a decision was come to last year as to the form the signal aspects should take to bring them into harmony, as far as possible, with those now standard in the rest of France. The ordinary upper right-hand quadrant semaphore is retained, with a red or green light. The two-armed junction semaphore has also been adhered to, but when both arms are exhibited for "Proceed at reduced speed," two yellow lights appear vertically instead of two greens, corresponding to the *rappel de ralentissement* of the other French lines.

Distant signals have the diamond-shaped disc of the *signal d'avertissement*, with the fishtailed arm, normally in line with the post, introduced in Alsace-Lorraine after the war to provide a third aspect. One yellow light indicates "caution" (disc exhibited), one green light "proceed" (disc out of sight), and two yellow lights horizontally denote "reduced speed" (disc out of sight and fishtailed arm exhibited). The night indications for running signals have thus been made practically standard all over French territory. Point indicators and trailable points continue in use in Alsace-Lorraine.

The ordinary general meeting of the San Paulo (Brazilian) Railway Co. Ltd. was held at Southern House, Cannon Street, E.C., on April 25, the Chairman, Mr. Oliver R. H. Bury, presiding.

The Secretary (Mr. Vernon Hinde) read the notice convening the meeting and the auditors' report.

The Chairman, in moving the adoption of the report and accounts, said that the results for the year before them might be regarded as satisfactory, as they showed a small, though progressive, increase in the traffic receipts of the railway. The receipts in currency of the railway, including the metre-gauge Bragantina section, amounted to 144,000 contos of reis, in comparison with 136,000 contos of reis in the year 1937. In sterling, converted at an average rate of 2.8d. to the milreis, the receipts were £1,661,000 compared with £1,691,000. This represented a decrease of rather over 7½ per cent., which accounted for the lower sterling receipt.

Features of the year's working were an increase of 159,000 tons, or 27 per cent. in coffee traffic, giving an increase of 34 per cent. in those receipts, and an important increase in cotton traffic; the continued growth of passenger receipts was satisfactory. Working expenses were 105,000 contos of reis against 94,000 contos of reis, or expressed in sterling, £1,207,000 compared with £1,174,000. The net profit resulting, after deduction of certain charges, was £344,427, compared with £410,637 in 1937. Deduction of interest and other charges left a balance for appropriation of £171,444. Out of this balance they proposed a final dividend of 2½ per cent., less income tax on the preference stock, making 5 per cent. for the year, and a dividend of 2 per cent., free of income tax, on the ordinary stock. This would absorb £85,000, leaving the sum of £86,444 to be carried forward, compared with £62,022 brought into the account.

The figures for both passengers and goods exceeded those of any previous year. The period during the crop season was one of intense activity, and they were assisted by the timely provision made for additional rolling stock and extra facilities. The extension of the metre-gauge Sorocabana Railway from Mayrink down to the port of Santos—giving an alternative route by railway to that port—was open throughout the year for goods traffic, and from August last for parcels traffic. An important volume of traffic, particularly from the metre-gauge lines, had been attracted to that route.

The results of their road motor organisation during the year were again encouraging. The total goods carried by their lorries was 336,137 tons, of which 313,525 tons were handed to the railway for transport

over the line. In the Bragantina section, a metre-gauge extension of the company's broad-gauge main line, there was a loss of £10,500, compared with £7,900 in the previous year. On this line they had put a railcar, run in conjunction with a similar vehicle on the main line, and they felt that this would give improved passenger service and satisfactory results in competition with rival road organisations.

With regard to the prospects for the current year, it was reasonable to expect that the aggregate tonnage would equal that of last year, though it was possible that the yield in gross receipts might fall short of last year by from 5 to 10 per cent.

The report and accounts were unanimously adopted.

Forthcoming Meetings

May 2 (Tues.).—**Compagnie Internationale des Wagons-Lits et des Grands Express Européens** (Ordinary General), 53, Boulevard Clovis, Brussels, at 2 p.m.

May 3 (Wed.).—**Canadian Pacific Railway Company** (Annual General), Principal office of the Company, Montreal, at noon.

May 4 (Thurs.).—**Snailbeach District Railways Company** (Ordinary General), Charing Cross Hotel, London, W.C., at 10.45 a.m.

May 4 (Thurs.).—**Shropshire & Montgomeryshire Light Railway Company** (Ordinary General), Charing Cross Hotel, London, W.C., at noon.

May 26 (Fri.).—**Société Nationale des Chemins de fer Belges** (Annual General), Gare de Bruxelles Midi, door D, Avenue Fonsny, Brussels, at 3 p.m.

Forthcoming Events

Apr. 29 (Sat.).—**Stephenson Locomotive Society** (Scottish). Visit to Cowlaers Works, L.N.E.R.

May 1 (Mon.) **Society of Engineers**, at Geological Society, Burlington House, Piccadilly, London, W.1., 6 p.m., "The Welding of Reinforcement in Concrete Construction," by M. Semet.

May 4 (Thurs.).—**Railway Club**, at Royal Scottish Corporation Hall, Fetter Lane, London, E.C.4., 7.30 p.m. "A Recent Visit to Germany," by Mr. W. A. Willox.

May 5 (Fri.).—**Institution of Railway Signal Engineers**. Visit to The Ediswan Co., Ponders End.

L.M.S.R., at Wharnclyffe Rooms, Hotel Great Central, Marylebone Road, London, N.W.1. Final Ambulance Competition.

May 6 (Sat.).—**Permanent Way Institution** (Manchester-Liverpool), at Birkenhead "Flat Bottom Track," by Mr. N. Swinerton.

May 8 (Mon.).—**Permanent Way Institution** (London), at Underground Railways' Dining Club, Pelham Street, S.W.7, 7 p.m. "The Use of Steel Sleepers," by Messrs. A. Carn, A. Easty, and T. Thomas. Lantern Lecture: "Steel Sleepers—The Corrosion Aspect," by Dr. J. Hudson.

May 9 (Tues.).—**Institution of Civil Engineers**, Great George Street, London, S.W.1. 6 p.m. Annual General Meeting.

NOTES AND NEWS

Dawlish Avoiding Line, G.W.R.—The Great Western Railway has purchased Dawlish vicarage for its new loop line, which will avoid the Teignmouth cliffs, and a new parsonage house is being acquired, according to *The Church Times*.

New Belgian High-Speed Services.—The new 60-min. trains between Brussels and Ostend, to be hauled by specially built streamlined Atlantic type locomotives, as described on page 654 of *THE RAILWAY GAZETTE* of April 21, are not expected to go into regular operation until July 15.

Durham - Blackhill Passenger Service Withdrawal.—Members of the Durham Rural Council were informed recently by Mr. A. S. Buswell, District Passenger Manager, York, L.N.E.R., that from May 1 passenger trains would be withdrawn between Durham and Blackhill and Blackhill and Tow Law. Poor patronage of the trains on those sections and heavy expenditure were given as reasons for this decision.

Tyne Kearney Tube Proposal.—Plans have been deposited for a Light Railway Order application for a Kearney-type tube railway under the River Tyne between North and South Shields. For carrying out the scheme, a public company entitled North & South Shields Electric Railway Limited has been registered. The directorate includes Mr. Ernest Remnant, a Director of the West Riding Automobile Co. Ltd., and Mr. E. W. Chalmers Kearney is the Engineer.

L.M.S.R. Women's Ambulance Competition.—Four teams competed in the final of the L.M.S.R. Women's Ambulance Competition, held at the Euston Hotel on April 14, when the awards were distributed by Mr. W. K. Wallace, Chief Civil Engineer. Mr. G. L. Darbyshire, Chief Officer for Labour and Establishment, presided. The results were: (1) London "C" (327½ points); (2) Preston (324 points); (3) Glasgow (312 points); and (4) Broad Street (264 points).

Railcar Accident Near Amiens.—Four passengers were killed and 25 injured near Amiens on April 20 when the 6.45 a.m. fast railcar train from Lille caught fire. It was passing Daours at speed when smoke and flames were seen issuing from the covered gangway, connecting the second and third cars. Panic-stricken passengers rushed toward the luggage van at the rear and tried to force the door open, but it jammed. Others tried in vain to break the toughened safety-glass windows of the car. Meanwhile the guard rushed through the cars to tell the driver, who pulled up the train within a distance of about 500 yd. The guard had been unable to use the ordinary signal, which was not working, probably owing to the fire. Railway workers on the line

quickly released the imprisoned passengers and put out the fire. The initial inquiry indicated that the fire was probably due to a lighted match or cigarette carelessly thrown down in the gangway and not to a short-circuit as was at first suggested. M. Le Besnerais, General Manager of the National Railways Company, left Paris immediately for the scene of the accident.

L.N.E.R. Ambulance Competition.—Teams representing the six districts of the North Eastern Area Centre of the St. John Ambulance Association competed at York on April 15 for the Wharton Shield. The award was won by Newcastle (Tyne Dock) with 304 points out of 350; Hull (Paragon) was second (281½ points); and Darlington (Shildon) third with 237½ points. Mr. C. M. Jenkin Jones, Divisional General Manager and President of the ambulance centre, presented the awards. He remarked on the increases of five in the number of teams competing, and of 16 in the classes formed in the area, where 188 classes were now active.

Northern Ireland Traffics.—Passengers (excluding season-ticket holders) carried on railways wholly in Northern Ireland during the year 1938 numbered 5,781,813, compared with 5,954,344 in 1937, and total passenger receipts fell from £291,394 to £284,909. Merchandise and minerals conveyed in 1938 were 489,026 tons, a decrease of 88,392 tons in comparison with 1937; the number of livestock fell from 246,919 to 231,680, and the total goods traffic receipts from £209,055 to £184,442. On railways partly in Northern Ireland, the ordinary passengers in 1938 were 5,579,025, against 5,697,993 in 1937, and the total passenger receipts of £473,296 were £1,068 lower. Merchandise and mineral tons increased from 922,806 to 948,368, but the number of livestock fell from 755,543 to 743,790. Total receipts from goods traffic in 1938 were £610,486, against £615,366 in 1937.

L.M.S.R. stations.—With the introduction of the L.M.S.R. spring timetable on Monday next, May 1, five stations will be closed and one new station opened. The stations to be closed are: Barton & Broughton, Brock, Scorton, and Galgate, between Preston and Lancaster; and Kirklee, situated on the Glasgow suburban line between Botanic Gardens and Maryhill. Barton & Broughton and Brock stations will be closed for passenger and parcels traffic, while Scorton, Galgate, and Kirklee will be closed entirely. Parcels and luggage in advance from or to addresses in the areas previously served by Barton & Broughton, Brock, Scorton, and Galgate stations will be collected and delivered from Preston, Garstang & Catterall, or Bay Horse. A new passenger station at Lea Hall, between Marston Green and

Stechford in the Birmingham outer suburban area, which is being opened on Monday, will deal with parcels, passenger, and miscellaneous traffic.

New Motorcar Facilities on Stranraer-Larne Route.—Motorists taking their cars to or from Northern Ireland via the Stranraer-Larne route will be able to drive them on and off the ship under their own power when the new motor vessel *Princess Victoria* is put into service by the L.M.S.R. in July. Work is now being carried out both at Larne and Stranraer in connection with the slipways over which cars will be driven on or off the vessel through its stern; at Stranraer, a new pier is being built for this purpose. The *Princess Victoria* will be capable of carrying from 70 to 80 motorcars on one deck; her passenger capacity will be about 1,500 and her speed 19 knots. She was launched from the yard of William Denny & Bros. Ltd., Dumbarton, on April 21.

G.W.R. Rugby Football Dinner.—Mr. K. W. C. Grand, Assistant to the General Manager, Great Western Railway, presided at the annual dinner of the Great Western Railway (London) Athletic Association Rugby Football Section, held on April 21, in the new Staff Dining Club, at Bishops Bridge Road, Paddington. There was a large attendance and visitors present included:—

Messrs. C. T. Cox, R. Carpmal, C. R. Dashwood, J. A. Kay, Peter Lawless, F. W. Lampitt, R. H. B. Nicholls, G. Orton, F. R. Potter, F. H. D. Page, R. A. P. Setterfield, H. Wheeler, F. G. Warren.

Mr. K. W. C. Grand, in proposing the toast of "Rugby Football," said that the club had experienced a satisfactory season. The 1st XV had played 28 games, won 16, drawn 2, and lost 10. The "A" XV had played 22, won 7, drawn 2, and lost 13. Referring to the inter-railway matches played under the Railway Athletic Association, he was pleased to report that the G.W.R. club was well represented in two matches played during the past season, namely, *versus* the Irish Railways, and *versus* the Eastern Counties. Mr. Peter Lawless, of *The Daily Telegraph*, responded in a speech full of interesting reminiscences and some practical advice. Other speeches followed and the toast of "The Guests" was responded to by Mr. J. A. Kay and Mr. C. R. Dashwood. The speeches were interspersed with a musical programme which included a musical entertainment by Messrs. Hammond and Oakley of Hanwell station.

Preliminary Railway Returns.—Preliminary returns relating to the railways of Great Britain for the year 1938 have been issued recently by the Ministry of Transport. Figures relating to the railway undertakings of the London Passenger Transport Board are excluded, and totals for Great Britain for 1938 are provisional, as the figures of some of the smaller companies have been estimated. Gross receipts for 1938 in respect of railway working

amounted to £164,800,000, compared with £171,392,000 in 1937, but working expenditure rose from £136,136,000 to £137,700,000, leaving net receipts of £27,100,000, against £35,256,000 for 1937. Net revenue for the year 1938 amounted to £29,800,000, compared with £38,684,000 for 1937, and £36,527,000 for 1936, and the average rate of interest and dividend paid per cent. of capital receipts was 2.68d. in 1938 against 3.43 per cent. in 1937, and 3.26 per cent. in 1936. Ancillary businesses produced net receipts of £600,000 in 1938, compared with £1,206,000 in 1937. The railway operating ratio for 1938 was 83.56 per cent. in 1938, against 79.43 per cent. in 1937.

Derwent Valley Light Railway.—At the meeting of the Derwent Valley Light Railway Company in York last month, Mr. C. W. Thompson, the chairman, said that, while they supported the "square deal" campaign of the main-line railways, their experience taught them that light railways did not always share in benefits given to the main lines. An Association of Minor Railway Companies, under the chair-

manship of Major H. A. Watson, a Director of the Derwent Valley Company, had, therefore, been formed to protect the interests of light railways in legislation, and had set forth in a memorandum a "square deal" for such lines. The annual report of the Derwent Valley Light Railway Company, which showed gross receipts of £7,716 and net revenue £1,785, was adopted.

Through Polish — Hungarian Traffic.—The Hungarian-Slovak boundary commission has conceded to Hungary a narrow strip of territory from the eastern end of Slovakia. Through this the important Ung Valley railway connecting Hungary with Poland runs for about 30 miles. Hungary now has complete control of this line up to the Polish frontier, and, according to the *Manchester Guardian*, a through express service from Budapest to Lemberg is running. Through goods services from Budapest to Gdynia—the Polish port on the Baltic Sea—have also been introduced, and, in addition, others between Latvia and Yugoslavia and Italy by this route.

British and Irish Traffic Returns

GREAT BRITAIN	Totals for 16th Week			Totals to Date		
	1939	1938	Inc. or Dec.	1939	1938	Inc. or Dec.
L.M.S.R. (6,831½ mls.)						
Passenger-train traffic...	426,000	479,000	- 53,000	6,637,000	6,797,000	- 160,000
Merchandise, &c. ...	513,000	412,000	+ 101,000	7,114,000	7,668,000	- 554,000
Coal and coke ...	270,000	183,000	+ 87,000	4,663,000	4,527,000	+ 136,000
Goods-train traffic ...	783,000	595,000	+ 188,000	11,777,000	12,195,000	- 418,000
Total receipts ...	1,209,000	1,074,000	+ 135,000	18,414,000	18,992,000	- 578,000
L.N.E.R. (6,320 mls.)						
Passenger-train traffic...	286,000	327,000	- 41,000	4,374,000	4,462,000	- 88,000
Merchandise, &c. ...	339,000	300,000	+ 39,000	4,944,000	5,432,000	- 488,000
Coal and coke ...	268,000	200,000	+ 68,000	4,160,000	4,206,000	- 46,000
Goods-train traffic ...	607,000	500,000	+ 107,000	9,104,000	9,638,000	- 534,000
Total receipts ...	893,000	827,000	+ 66,000	13,478,000	14,100,000	- 622,000
G.W.R. (3,737½ mls.)						
Passenger-train traffic...	185,000	215,000	- 30,000	2,814,000	2,849,000	- 35,000
Merchandise, &c. ...	219,000	145,000	+ 74,000	3,015,000	3,101,000	- 86,000
Coal and coke ...	121,000	72,000	+ 49,000	1,842,000	1,902,000	- 60,000
Goods-train traffic ...	340,000	217,000	+ 123,000	4,857,000	5,003,000	- 146,000
Total receipts ...	525,000	432,000	+ 93,000	7,671,000	7,852,000	- 181,000
S.R. (2,140 mls.)						
Passenger-train traffic...	286,000	314,000	- 28,000	4,431,000	4,456,000	- 25,000
Merchandise, &c. ...	65,000	58,500	+ 6,500	910,000	966,500	- 56,500
Coal and coke ...	32,000	21,500	+ 10,500	558,000	550,500	+ 7,500
Goods-train traffic ...	97,000	80,000	+ 17,000	1,468,000	1,517,000	- 49,000
Total receipts ...	383,000	394,000	- 11,000	5,899,000	5,973,000	- 74,000
Liverpool Overhead ...	1,332	1,360	- 28	20,861	21,136	- 275
(6½ mls.)						
Mersey (4½ mls.) ...	4,458	5,009	- 551	72,074	70,923	+ 1,151
*London Passenger Transport Board ...	577,600	578,000	- 400	24,397,600	24,172,100	+ 225,500
IRELAND						
Belfast & C.D. pass.	1,959	3,797	- 1,838	29,253	29,049	+ 204
" " goods	386	325	+ 61	6,835	6,962	- 127
" " total	2,345	4,122	- 1,777	36,088	36,011	+ 77
Great Northern pass.	8,600	14,450	- 5,850	140,150	137,050	+ 3,100
(543 mls.)						
" " goods	11,650	7,200	+ 4,450	157,300	139,050	+ 18,250
" " total	20,250	21,650	- 1,400	297,450	276,100	+ 21,350
Great Southern pass.	30,737	42,921	- 12,184	470,742	473,135	- 2,393
(2,076 mls.)						
" " goods	43,756	35,418	+ 8,338	646,057	644,792	+ 1,265
" " total	74,493	78,339	- 3,846	1,116,799	1,117,927	- 1,128

Easter Monday, 1938

* 43rd Week (before pooling)

British and Irish Railway Stocks and Shares

Stocks	Highest 1938	Lowest 1938	Prices	
			April 26, 1939	Rise/ Fall
G.W.R.				
Cons. Ord.	65½	25½	25	—
5% Con. Prefce....	118½	74	76	—
5% Red. Pref. (1950) ..	111½	90	89	—
4% Deb.	111	97½	93	—
4½% Deb....	112½	100½	95	—
4½% Deb....	118½	104	102½	—
5% Deb.	131½	119	112½	-1
2½% Deb....	69½	60	60½	—
5% Rt. Charge ...	129	114	106½	-1
5% Cons. Guar. ...	128½	103	100	—
L.M.S.R.				
Ord.	30½	11	12½	-¼
4% Prefce. (1923) ...	70½	23	29½	+1
4% Prefce.	82½	43½	49½	+2
5% Red. Pref. (1955) ..	103½	66	69½	—
4% Deb.	105½	85	89	—
5% Red. Deb. (1952) ...	114½	105	107	-½
4% Guar.	102½	77½	77	—
L.N.E.R.				
5% Pref. Ord.	89½	3½	4	—
Def. Ord.	47½	21½	2	—
4% First Prefce.	68½	21	24½	—
4% Second Prefce.	27½	8	10	—
5% Red. Pref. (1955) ..	97	40½	46½	—
4% First Guar.	97½	66½	67	—
4% Second Guar.	91½	52	51	—
3% Deb.	79½	60	61	—
4% Deb.	104½	77	82	—
5% Red. Deb. (1947) ...	110½	97	102½	—
4½% Sinking Fund Red. Deb.	108½	101	100	—
SOUTHERN				
Pref. Ord.	87	47½	62	—
Def. Ord.	21½	9½	12½	-¼
5% Pref.	115	83	86	-1
5% Red. Pref. (1964) ...	115½	98	95½	—
5% Guar. Prefce.	128½	106	106	—
5% Red. Guar. Pref. (1957)	116	109½	106½	—
4% Deb.	109½	95	94½	+1
5% Deb.	129	117	112½	—
4% Red. Deb. 1962-67	107	101½	101½	—
BELFAST & C.D.				
Ord.	4	3½	4	—
FORTH BRIDGE				
4% Deb.	102	99½	96½	—
4% Guar.	103½	94½	94	—
G. NORTHERN (IRELAND)				
Ord.	5½	2½	3½	—
G. SOUTHERN (IRELAND)				
Ord.	25½	8½	8	-2
Prefce.	35	13	12½	—
Guar.	70½	30½	25½	-½
Deb.	83	56	48	—
L.P.T.B.				
4½% "A"	119½	107½	107	—
5% "A"	130	117	114½	-1
4½% "T.F.A."	108	98	101½	—
5% "B"	122½	105	107	—
"C"	84	68	64½	-1
MERSEY				
Ord.	24½	16½	20	-½
4% Perp. Deb.	102½	94½	91	-3½
3% Perp. Deb.	77	69	66½	—
3% Perp. Prefce.	66½	57	51½	-3½

CONTRACTS AND TENDERS

New Locomotives for Egypt

The First Polish Locomotive Building Works (Première Fabrique de Locomotives en Pologne) has received an order from the Egyptian State Railways Administration for 10 2-6-0 type locomotives and tenders. This order is part of the inquiry for 16 locomotives of this type which was announced in our issue of January 6.

French Locomotive Orders

The French National Railways Administration, as was recorded in our issue of April 8, 1938, last year decided to order 50 locomotives of the 5.1200 Nord type, which was illustrated and described in THE RAILWAY GAZETTE, of December 29, 1933, page 964. The orders have now been placed as follow: Ateliers de Construction du Nord de la France et des Mureaux, 15; Acieries du Nord, 25; and Société Alsacienne de Constructions Mécaniques, 10. The new locomotives, which are four-cylinder compounds with driving wheels 5 ft. 1 in. dia., will differ from the original Nord locomotives in one or two details. Instead of copper fireboxes, the fireboxes will be of welded steel, and will incorporate a Nicholson thermic syphon. The top of the firebox will be slightly inclined, so as to permit the use of these engines on more steeply-graded lines than those of the Nord. Fifteen of the new engines will be fitted with mechanical stokers, as already fitted to a few of the existing Nord locomotives. Those engines not so fitted will have pneumatically-operated fire doors controlled by pedals.

P. & W. MacLellan Limited has received orders from the South Indian Railway Administration for 10½ tons of steel bars, to be supplied to the inspection of Messrs. Robert White & Partners.

Wagons for India

The Gregg Car Co. Ltd. has received orders from the Jaipur State Railway for 150 IRS "MCJ" type covered goods wagons, metre-gauge and four IRS "MBBG" type brake vans, metre-gauge, to be supplied to the inspection of Messrs. Robert White & Partners.

The A.B.C. Coupler Co. Ltd. has received orders from the Jaipur State Railway for 156 vehicle sets of MCA "PH" type metre gauge couplers to be supplied to the inspection of Messrs. Robert White & Partners.

G.W.R. Bridge Reconstructions

The following bridgeworks are to be undertaken:—

The bridge carrying the G.W. & G.C. joint line (Northolt Junction to High Wycombe) over a public road near Denham is to be reconstructed.

At Fleur-de-Lis the company, at the request of the Bedwellty Urban District Council, will reconstruct and lengthen the bridge under the line north of the halt.

The company, at the request of the Herefordshire County Council, will widen

to an average width of 32 ft. 3 in. between parapets, Sunset bridge over the railway at Kington. At the same time a full-strength structure will be provided.

At the request of the Bilston Corporation the company will, while carrying out reconstruction work, strengthen and widen to 43 ft. Ward Street bridge over the railway at Priestfield.

By arrangement with the Corporation of Swindon, Rodbourne Road bridge under the Gloucester branch is to be reconstructed and lengthened.

Pullman Inc. has received an order from the Great Northern Railway Company, U.S.A., for 1,000 freight cars at a cost of \$3,000,000, states Reuters.

The Bombay, Baroda & Central India Railway Administration has placed orders to the inspection of Messrs. Rendel, Palmer & Tritton with Banting & Tresilian Limited for 41 copper firebox plates and with the Superheater Co. Ltd. for 254 superheater elements.

Wagons for Malaya

Craven's Railway Carriage & Wagon Co. Ltd. has received orders from the Crown Agents for the Colonies for the following wagons required for the Federated Malay States Railways: 16 bogie low-sided wagons and 36 four-wheeled low-sided wagons.

Guest, Keen & Nettlefolds Limited has received an order from the Bengal & North Western Railway Administration for 315,500 dogspikes to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The Skefko Ball-Bearing Co. Ltd. has received an order from the Morvi Railway Administration for the supply of 24 "SKF" roller bearing axleboxes to be supplied to the inspection of Messrs. Robert White & Partners.

The Crown Agents for the Colonies have recently placed the following orders:—

V. & R. Blakemore: Bolts.
Stanton Ironworks Co. Ltd.: Cast-iron spun pipes.

Pulsometer Engineering Co. Ltd.: Centrifugal pumps.

Brown Lenox & Co. Ltd.: Chain cable.
H. Berry & Co. Ltd.: Chain testing machine.
Morris Industries Exports Limited: Chassis.
Chloride Electrical Storage Co. Ltd.: Chloride cells and elements.

Nuts & Bolts (Darlaston) Limited: Clip bolts.
Wolverhampton Corrugated Iron Co. Ltd.: Corrugated steel sheets.

Tees Side Bridge & Engineering Works Limited: Deck bridges.

English Drilling Equipment Company: Drilling rig and spares.

W. T. Henley's Telegraph Works Co. Ltd.: Dry core cable.

Babcock & Wilcox Limited: Electric capstans and feed water regulators.

Turners Asbestos Cement Co. Ltd.: Everite pipes.

Win. Jacks & Co. Ltd.: Expanded metal sheets.

Bowesfield Steel Co. Ltd.: Galvanised corrugated steel sheets.

Ruston & Hornsby Limited: Generating plant.

Tangyes Limited: Hydraulic testing machine.
Phosphor Bronze Co. Ltd.: Ibis white metal jackets.

The L.M.S.R. has placed orders for four 10-ton diesel travelling rail grib cranes required for use on engineering work. Two are to be supplied by Ransomes & Rapier Limited and two by Taylor & Hubbard Limited.

G.W.R. Works at Various Stations and Depots

Olton & Acocks Green.—The up and down main lines between 123 m. 40 ch. and 125 m. 5 ch., near Acocks Green & Olton, are being realigned to improve the running of express trains between Paddington and Birmingham.

Swindon Works.—In the "AE" (Erecting) shop, locomotive works, a pit is being provided on each side of the ground wheel lathe to assist the operator; at the same time, the control is being re-arranged.

Towyn.—To give protection against sea erosion of the railway embankment on the Dovey Junction to Pwllheli line, near Towyn, large blocks of loose stone are being roughly pitched to form a wall along the embankment.

The following places are to have electric lighting installed: Brimscombe, Brimscombe Bridge Halt, Chipping Sodbury, Coal Pit Heath, Ebley Crossing Halt, Ham Mill Crossing Halt, Lydbrook Junction, Newnham, Stonehouse, Portskewett, and Saltash.

The Chinese Government Purchasing Commission on behalf of the Chinese Ministry of Communications has placed orders, to the inspection of Messrs. Fox & Mayo, for the following equipment required for the Szechuen-Yunnan Railway:—

R. A. Lister & Co. Ltd.: Diesel-engine driven portable lighting sets.

Holman Bros. Limited: Drills, steel sharpeners, and accessories.

Ingersoll Rand Co. Ltd.: Rock cutting equipment and spares.

Tangyes Limited: Pumps and boilers.

The Associated Equipment Co. Ltd. has received a repeat order from the City of Oxford Motor Services Limited for six Regent passenger vehicles.

Leyland Motors Limited has received an order from the L.N.E.R. for three Leyland goods vehicles.

Werkspoor N.V. through J. O'Hara Murray & Co. Ltd. has received an order from the Mysore State Railways for four four-wheeled underframes and four bogie carriage underframes, complete with wheels and axles, to be supplied to the inspection of Messrs. Rendel, Palmer & Tritton.

The Argentine State Railways Administration is calling for tenders, to be presented in Buenos Aires by May 30, for the supply of a breakdown crane. Firms desirous of offering a crane of United Kingdom manufacture can obtain further details from the Department of Overseas Trade, London, S.W.1. Reference number T.Y. 21101/39 should be quoted.

Tenders are invited by the South Indian Railway Administration, receivable by May 5, at 91, Petty France, Westminster, S.W.1, for the supply of

OFFICIAL NOTICES

Crown Agents for the Colonies

COLONIAL GOVERNMENT APPOINTMENTS

APPLICATIONS from qualified candidates are invited for the following post:—
CHIEF DRAUGHTSMAN (MECHANICAL), required for the Federated Malay States Railway for three years with possible permanency. Salary \$500 a month rising by annual increments of \$20 a month to \$600 a month (the Government rate of exchange is now 2s. 4d. to the dollar). A children's allowance is payable to married officers with children. Free passages, and if married, for wife and children, not exceeding four persons, subject to certain conditions. Liberal leave on full salary. Candidates not more than 32 years of age, must have served an apprenticeship with a British Railway or firm of Locomotive Builders and have had at least three years' experience in a

locomotive or Carriage and Wagon Drawing Office. They must possess a Higher National Certificate in Mechanical Engineering or equivalent qualification.

Apply at once by letter, stating age, whether married or single, and full particulars of qualifications and experience, and mentioning this paper, to the Crown Agents for the Colonies, 4, Millbank, London, S.W.1, quoting M/5699.

OFFICIAL ADVERTISEMENTS

OFFICIAL ADVERTISEMENTS intended for insertion on this page should be sent in as early in the week as possible. The latest time for receiving official advertisements for this page for the current week's issue is noon on Thursday. All advertisements should be addressed to:—*The Railway Gazette*, 35, Tothill Street, Westminster, London, S.W.1.

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copper plates. Copies of the drawings may be obtained at the offices of the consulting engineers, Messrs. Robert White & Partners, 3, Victoria Street, Westminster, S.W.1.

Locomotive Boilers required for India

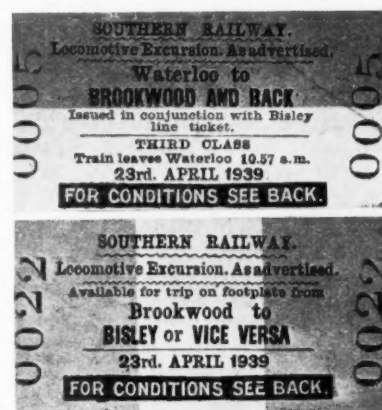
The North Western Railway, Lahore, is calling for tenders (Tender number 210-S./18/19) for the supply and delivery of five locomotive boilers, superheated, for N (2-10-0) class non-standard engines. Tenders are due to be received at the General Manager's Office, North Western Railway, Lahore, India, by May 15. A copy of the specification, may be borrowed from the Department of Overseas Trade. Copies of the drawings referred to in the specification are available for reference at the offices of Hodges Bennett & Co. Ltd., 16, Victoria Street, London, S.W.1.

The Greek Ministry of Railways has decided to take up at once the question of making use of Greek brown coal, especially on the State railways, learns Reuters Trade Service from foreign papers. In order to develop the use of brown coal as fully as possible, it is planned to invite tenders and entrust the mining of the brown coal deposits to a company which will not only undertake open-pit mining, but also the manufacture of briquettes and the turning to profit of residues and waste. The State Railways will use at least 100,000 tons a year. The company must have the legal status of a Greek company and tenders must be received by June 1. The Greek press welcomes the decision of the Ministry of Railways and draws attention to the satisfactory outcome of the research into the quality of Greek brown coal recently carried out, chiefly by German experts. The deposits are said to be rich. According to reports foreign concerns are showing great interest in the exploitation of this coal.

The A.I. Electric Welding Machines Limited is the name of the firm which manufactured and supplied the butt welding machine, reference to which was made in the article on St. Rollox works, L.M.S.R., published in the April 21 issue of *THE RAILWAY GAZETTE*.

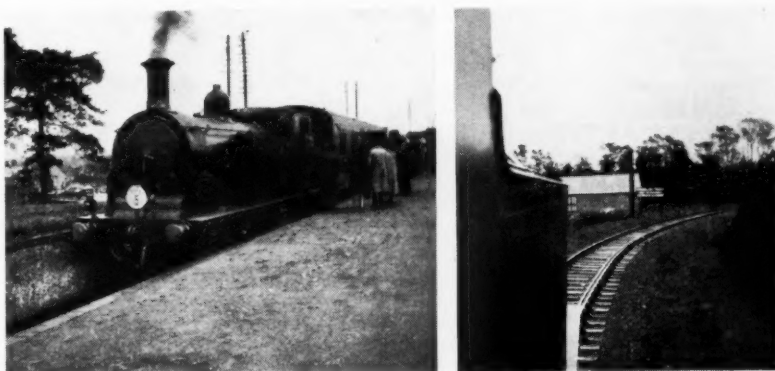
Excursionists on the Footplate

As recorded in our editorial columns last week, the Southern Railway advertised for Sunday last a novel type of excursion, in which—probably for the first time—members of the public were allowed access to the footplate of a moving locomotive. The Bisley branch, which witnessed this relaxation of official caution, is hardly the place in which to expect anything in the way of high-speed running, and though one of the drivers declined to his small and dutifully-impressed audience that 70 m.p.h. was easily attainable by his steed, such magnificent progress was debarred by the 10 m.p.h. restriction over the line. Nevertheless the two Drummond 0-4-4 tanks, coupled back to back, proceeded gravely down to Bisley and with becoming austerity, back to the funereal neighbourhood of Brookwood, conveying a lively and appreciative cargo of all ages and both sexes. In all over 100 were conveyed, not to mention the many who took advantage of the "cut price" ride, offered later in the day by the benevolent railway company, for a second experience. Every handle that could be turned on the "Lord Nelson" locomotive on view (which proved to be one fitted with a



Special tickets for the trip

Lemaître blastpipe and high-sided tender) was made to perform its allotted task over and over again. A small exhibition of photographs was examined with great interest and, though the weather failed to clear, the excellent meals obtainable in the dining cars specially parked at the station more than made up this deficiency.



Two snapshots on the footplate excursion

Railway Share Market

The past week's traffic receipts created a good impression, but home railway securities were unable to move against the general trend of markets, and although price changes were moderate, they were mostly against holders. Sentiment was assisted by the provisions of the Budget, which were less drastic than had been feared in many quarters, and there was general satisfaction with the decision not to increase income tax or N.D.C. Nevertheless, the volume of business on the Stock Exchange failed to show improvement, pending the next developments in international affairs.

Following an earlier decline, Southern deferred improved fractionally to 12½, and the preferred stock was around 61½, but the 5 per cent. preference was reactionary and has moved down to 85½, while the 4 per cent. debentures were quoted at 94. After declining to 12½, L.M.S.R. ordinary improved to 12½, while the 4 per cent. first preference was 49½, the 1923 preference 29½, and the 4 per cent. guaranteed stock 77. The 4 per cent. debentures transferred around 88½. Hopeful views remain current in regard to the traffic outlook of the L.M.S.R. and L.N.E.R.

owing to the growing activity in the heavy industries, which is expected to be maintained as a result of further acceleration of the armament programme. It is generally believed that the output of steel and pig-iron will show further increases for the current month. L.N.E.R. issues attracted very little attention and the guaranteed stocks were out of favour, although they would appear to have been reduced to unduly low levels. The first guaranteed was 66 and the second guaranteed 50, while the first preference was 24½ and the second preference 9½. The 4 per cent. debentures were quoted at 81 and the 3 per cent. debentures at 60½. Great Western ordinary rallied, but subsequently went back to 24½. The 5 per cent. preference was lower at 75½ at which the yield is around 6½ per cent., and the 4 per cent. debentures were 92½. In most cases debenture and other prior charge stocks of the main line railways would appear to give attractive yields, but they are unlikely to improve until markets show a sustained rally and there is a firmer tendency in Government securities. Stocks of the ordinary and junior preference class can hardly be regarded as being

at levels which discount the more hopeful views as to the traffic outlook, and they would no doubt show ready response in price when there is a reasonable amount of speculative activity on the Stock Exchange. London Transport issues have been reactionary, awaiting the decision on the application for higher fares. The "C" stock changed hands around 65, while the 5 per cent. "A" stock was 113.

Argentine railway securities were again inactive but on the whole they were steadier, particularly those of the B.A. Gt. Southern, but Central Argentine issues were subject to a little selling. Among Brazilian stocks San Paulo at 25 was unaffected by the statements at the annual meeting. Elsewhere Antofagasta preference declined to 21 and Nitrate Rails lost an earlier small improvement. American railway shares moved down as a result of the trend of Wall Street markets. Canadian Pacific remained around 4, but the debentures were lowered to 66. Bombay Baroda were 102 and various other Indian railway securities were reactionary, but declines did not exceed more than a point.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1938-39	Week Ending	Traffics for Week		No. of Weeks	Aggregate Traffics to Date			Shares or Stock	Prices						
			Total this year	Inc. or Dec. compared with 1938		Totals		Increase or Decrease		Highest 1938	Lowest 1938	Apr. 26, 1939	Yield (See Note)			
						This Year	Last Year									
South & Central America	Antofagasta (Chili) & Bolivia	834	23 4.39	£ 13,540	—	£ 5,900	16	220,230	278,420	—	£ 58,190	Ord. Stk.	14	71½	7	Nil
	Argentine North Eastern ..	753	15.4.39	9,094	+	571	42	398,069	377,823	+	20,246	A. Deb.	82	75	70½	Nil
	Argentine Transandine ..	—	—	—	—	—	—	—	—	—	—	6 p.c. Deb.	8	7	7	Nil
	Bolivar	174	Mar., 1939	4,600	—	200	13	11,700	11,900	—	200	Bonds	10	4	6	85½
	Brazil	—	—	—	—	—	—	—	—	—	—	Ord. Stk.	61½	31½	3	Nil
	Buenos Ayres & Pacific ..	2,801	22.4.39	110,112	+	14,205	43	3,762,411	3,798,888	—	36,477	Mt. Deb.	15½	8	14	Nil
	Buenos Ayres Central ..	190	8 4.39	\$64,900	—	\$18,200	41	\$4,129,900	\$4,797,400	—	\$667,500	Ord. Stk.	175½	81½	8	Nil
	Buenos Ayres Gt. Southern ..	5,082	22.4.39	161,911	+	14,951	43	6,190,194	6,488,212	—	298,014	Ord. Stk.	12½	5	6	Nil
	Buenos Ayres Western ..	1,930	22.4.39	64,640	+	16,377	43	1,950,434	1,951,737	—	1,303	"	134½	55½	71½	Nil
	Central Argentine	3,700	22.4.39	132,115	+	25,570	43	5,033,880	5,224,951	—	191,071	"	3	21½	3½	Nil
	Do.	—	—	—	—	—	—	—	—	—	—	Ord. Stk.	3	114	1½	Nil
	Cent. Uruguay of M. Video	972	15.4.39	19,385	—	1,32½	42	767,324	757,642	+	9,682	Ord. Inc.	38½	3½	2	Nil
	Cordoba Central	1,218	—	—	—	—	—	—	—	—	—	Stk.	28	22½	22	87½
	Costa Rica	188	Feb., 1939	21,719	+	2,952	35	177,211	197,323	—	20,112	1 Mt. Db.	105½	104	103½	51½
	Dorada	70	Mar., 1939	14,300	—	100	13	40,400	46,800	—	6,400	Ord. Stk.	71½	31½	4½	Nil
	Entre Rios	810	15.4.39	14,851	+	3,983	42	650,523	598,237	+	52,286	Ord. Sh.	3/—	1/—	1½	Nil
	Great Western of Brazil ..	1,092	22.4.39	8,500	+	3,000	16	171,000	130,500	+	40,500	1st Pref.	6d.	6d.	1½	Nil
	International of Cl. Amer. ..	794	Feb., 1939	\$549,437	+	\$72,140	8	\$1,097,710	\$964,438	+	\$133,272	Ord. Stk.	8	1	2	Nil
	Interoceanic of Mexico ..	—	—	—	—	—	—	—	—	—	—	Stk.	8	61½	7½	Nil
	La Guaira & Caracas ..	22½	Mar., 1939	6,415	+	1,320	13	15,820	14,675	+	1,145	Ord. Stk.	4	1	2	Nil
Leopoldina	1,918	22.4.39	14,538	—	2,984	16	325,871	305,306	+	20,565	"	14	116	1½	Nil	
Mexican	483	21.4.39	\$321,200	+	\$7,600	16	\$5,049,500	\$5,014,200	+	\$35,300	"	78	1½	1½	Nil	
Midland of Uruguay ..	319	Mar., 1939	8,943	—	1,388	39	82,558	86,303	—	3,745	Ord. Sh.	52/9	19½	15½	51½	
Nitrate	386	15.4.39	5,123	+	85	15	38,118	53,035	—	14,917	Pr. Li. Stk.	60	55½	47½	128½	
Paraguay Central	274	15.4.39	\$2,879,000	+	\$442,000	42	\$125,908,000	\$128,716,000	—	\$2,808,000	Pref.	53½	15½	2	Nil	
Peruvian Corporation ..	1,059	Mar., 1939	69,598	—	10,836	39	609,165	740,756	—	131,591	Pr. Li. Db.	23	20	19½	Nil	
Salvador	100	15.4.39	419,450	—	42,050	42	4,882,139	4,856,725	—	425,414	Ord. Stk.	64	28	25½	71½	
San Paulo	153½	16.4.39	29,448	+	1,272	15	426,594	470,372	—	43,778	Ord. Sh.	15½	1½	1½	11½	
Taita	160	Mar., 1939	3,735	+	2,450	39	27,530	31,955	—	4,425	Ord. Stk.	38½	1½	1	Nil	
United of Havana	1,353	22.4.39	32,937	—	9,634	43	1,003,333	1,081,407	—	78,074	Deb. Stk.	2	1	2	Nil	
Uruguay Northern	73	Mar., 1939	852	—	145	39	9,110	8,478	+	632	"	—	—	—	—	
Canada	Canadian National	23,772	14 4.39	703,106	+	44,198	15	9,616,767	9,539,668	+	77,099	Perp. Dbs.	72	60	69	51½
	Canadian Northern	—	—	—	—	—	—	—	—	—	4 p.c.	104	90	99½	4	Nil
	Grand Trunk	—	—	—	—	—	—	—	—	—	Ord. Stk.	87½	41½	4	Nil	
	Canadian Pacific	17,183	21.4.39	457,000	—	6,200	16	7,312,400	7,484,400	—	172,000	"	—	—	—	—
India	Assam Bengal	1,329	31.3.39	46,275	+	1,500	52	1,524,605	1,403,562	+	121,043	Ord. Stk.	81½	70	67	41½
	Barsi Light	202	10.4.39	3,517	—	2,940	2	3,517	6,457	—	2,940	Ord. Sh.	60½	54½	50½	51½
	Bengal & North Western ..	2,108	10.4.39	74,657	—	18,488	2	74,657	93,145	—	18,488	Ord. Stk.	311	278	253	71½
	Bengal Doonars & Extension	161	10.4.39	2,970	—	694	2	2,970	3,664	—	694	"	89	83	85½	75½
	Bengal-Nagpur	3,272	10.4.39	215,625	+	5,978	2	215,625	209,647	+	5,978	"	95½	90	87½	45½
	Bombay, Baroda & Cl. India	3,085	20.4.39	267,900	—	15,825	3	527,550	558,450	—	30,900	"	112½	95	101½	56½
	Madras & Southern Mahratta	2,957	31.3.39	175,425	—	29,384	52	5,653,513	5,411,504	+	242,009	"	108	97	94½	71½
	Rohilkund & Kumaon ..	571	10.4.39	15,918	—	3,366	2	15,918	19,284	—	3,366	"	308	285	270	61½
	South Indian	2,531½	31.3.39	129,903	+	3,407	52	4,093,149	4,198,876	—	102,727	"	104	101	100½	41½
	Beira-Umtali	204	Feb., 1939	73,349	—	13,815	21	399,916	443,755	—	43,839	Prf. Sh.	—	—	—	—
Various	Egyptian Delta	620	31.3.39	5,381	—	622	52	224,647	237,022	—	12,375	"	78	5/6	—	Nil
	Kenya & Uganda	1,625	Mar., 1939	279,634	—	4,595	13	782,935	823,885	—	40,950	B. Deb.	49	41	40½	85½
	Manila	—	—	—	—	—	—	—	—	—	Inc. Deb.	93½	89	90½	47½	
	Midland of W. Australia ..	277	Feb., 1939	14,943	—	119	35	122,176	113,039	+	9,137	"	—	—	—	—
	Nigerian	1,900	18.3.39	41,098	+	3,224	51	2,053,275	2,742,256	—	688,981	"	—	—	—	—
	Rhodesia	2,442½	Feb., 1939	327,027	—	64,056	21	1,838,418	2,101,534	—	263,116	"	—	—	—	—
	South Africa	13,284	15.4.39	605,292	—	17,422	3	1,364,040	1,338,344	+	25,696	"	—	—	—	—
Victoria	4,774	Jan., 1939	782,635	—	110,925	31	5,516,376	5,640,789	—	124,413	"	—	—	—	—	

NOTE.—Yields are based on the approximate current prices and are within a fraction of 1/16.

† Receipts are calculated @ 1s. 6d. to the rupee

§ ex dividend

The variation in Sterling value of the Argentine paper peso has lately been so great that the method of converting the Sterling weekly receipts at the par rate of exchange has proved misleading, the amount being over estimated. The statements are based on the current rates of exchange and not on the par value